Slant/Fin®

PRODIGY 21® Models KC-50 and KC-100

• Cast-iron • Gas-fired • Sealed combustion • Hot water boiler
• Direct vent or Category IV venting flexibility • Wall mounted

INSTALLATION AND OPERATING INSTRUCTIONS

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CANADIAN GAS ASSOCIATION APPROVED

This manual must be left with owner, hung on or adjacent to the boiler. Owner should retain manual for future reference.

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IMPORTANT

READ ALL OF THE FOLLOWING WARNINGS AND STATEMENTS BEFORE READING THE INSTALLATION INSTRUCTIONS

WARNING
LIQUEFIED PETROLEUM (L.P.)
PROPANE GAS-FIRED BOILERS

Installation location ONLY as permitted in paragraph entitled "LIQUEFIED PETROLEUM (L.P.) PROPANE GASFIRED BOILER LOCATION" on page 4 of this instruction book.
The above warning does not apply to **NATURAL** gas-fired boilers.

The installation must conform to the requirements of the authority having jurisdiction or, in the absence of such requirements, to the National Fuel Gas Code, ANSI Z223.1-latest edition or CAN/CGA B149.1-M95 or latest edition for natural gas and CAN/CGA B149.2-M95 or latest edition for propane. The installation must also conform to the additional requirements in this Slant/Fin Instruction Book.

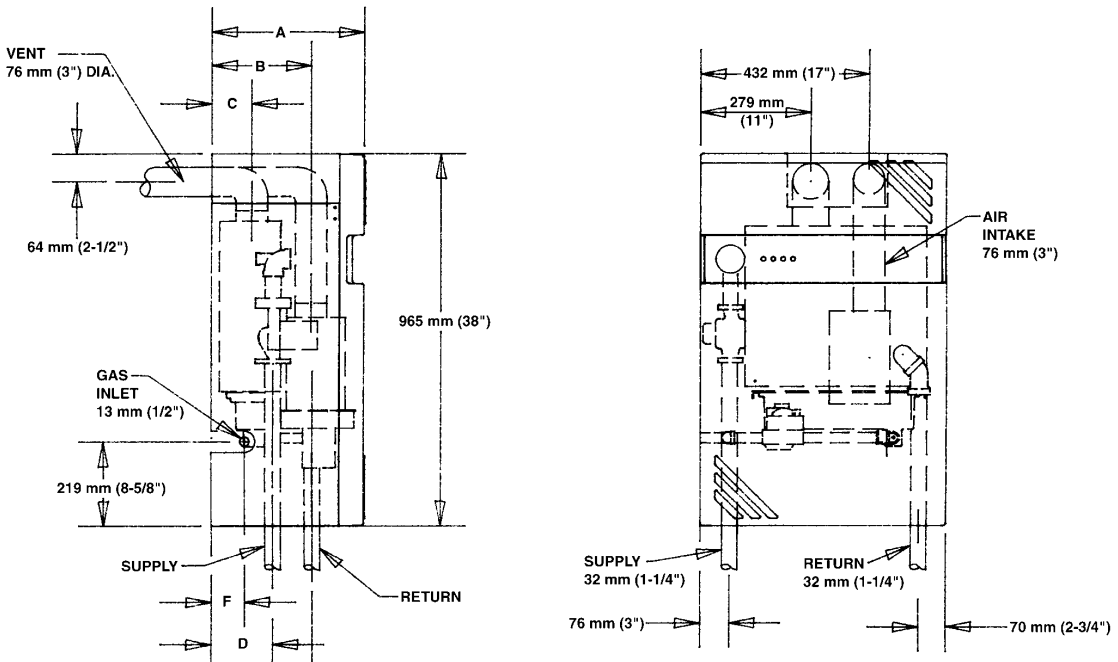
In addition, where required by the authority having jurisdiction, the installation must conform to American Society of Mechanical Engineers Safety Code for Controls and Safety Devices for Automatically Fired Boilers, No. CSD-1 or CAN/ CGA B149.1-M95 or latest edition for natural gas, and CAN/ CGA B149.2-M95 or latest edition for propane. If there is any conflict in the above requirements, then the more stringent requirement will apply.

WARNING
This boiler, gas piping and accessories must be installed, connected, serviced and repaired by a trained, experienced service technician, familiar with all precautions required for gas-fired equipment and licensed otherwise qualified, in compliance with the authority having jurisdiction.

Heating Contractor	**Boiler Model Number**
Address	**Boiler Serial Number**
Phone Number	**Installation Date**

SPECIFICATIONS AND DIMENSIONS

Figure 1. Dimensions of boiler



Boiler Model	DIMENSIONS											
	A		B		C		D		E		F	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
KC-50	394	15-1/2	254	10	102	4	152	6	267	10-1/2	32	1-1/4
KC-100	470	18-1/2	330	13	178	7	229	9	343	13-1/2	89	3-1/2

Boiler Model	Input				No. of Sections	Gas Type	Gas Supply Pressure				Shipping Weight		Boiler Water Volume	
	High Fire		Low Fire				Max		Max					
	W	Btuh	W	Btuh			mm	in	mm	in	kg	lb	L	U.S. gal
KC-50	14 500	50,000	7 500	25,000	1	Natural	229	9	89	3.5	100	220	1.9	0.5
						Propane	356	14	279	11				
KC-100	29 500	100,000	14 500	50,000	2	Natural	229	9	89	3.5	127	280	3.8	1.0
						Propane	356	14	279	11				

INSTALLATION REQUIREMENTS

NOTICE: INSTALLATION AND SERVICE MUST BE PERFORMED BY A QUALIFIED HEATING CONTRACTOR

The installation must conform to the requirements of the National Fuel Gas Code ANSI Z223.1, or CAN/CGA B149.1 - M95 or latest edition for natural gas, and CAN/CGA B149.2 - M95 or latest edition for propane and the requirements of the authority having jurisdiction as well as the requirements in this instruction manual. In addition, where required by the authority having jurisdiction, installation must conform to the Standard for Controls and Safety Devices for Automatically Fired Boilers, ANSI/ASME CSD-1. If there is any conflict in the above requirements, then the more stringent requirement will apply.

BOILER LOCATION AND CLEARANCES

BOILER LOCATION

Boiler must be wall mounted and can be installed on a combustible wall. The wall must be capable of supporting the weight of the boiler filled with water. Structure through which venting will pass must be free and clear for opening (i.e. no hidden conduit, telephone cables or other obstructions).

Boiler location should be such that the gas ignition system components are protected from water (dripping, spraying, rain, etc.) during appliance operation and service (circulator replacement, condensate trap, control replacement, etc.).

Boiler can be installed above both combustible and noncombustible floors, but must NOT be installed above carpeting.

For a closet installation, ventilation openings must be provided through a door or wall to prevent excessive heat buildup. Two openings, one near the floor and one near the ceiling, should be sized to assure sufficient air circulation in the closet (minimum 64 500 mm^2 (100 sq. inches) each).

WARNING
LIQUEFIED PETROLEUM (L.P.) PROPANE GAS-FIRED BOILER LOCATION
REQUIRES SPECIAL ATTENTION

Liquefied Petroleum (L.P.) propane gas is *heavier than air*. Therefore, propane boilers, piping, valves must NOT be installed in locations where propane leaking from defective equipment and piping will “pool” in a basement or other space below the leak.

A spark or flame from the boiler or other source may ignite the accumulated propane gas causing an explosion or fire. Provide a level, solid foundation for the boiler. Location should be as near the chimney as possible so that the flue pipe from boiler to chimney is short and direct.

The UNIFORM MECHANICAL CODE may be in effect in your geographic area

The following precautions are cited by the 1994 UNIFORM MECHANICAL CODE, section 304.6 or CAN/CGA B149.2 - M95 or latest edition for propane:

“**LPG Appliances**. Liquefied petroleum gas-burning appliances shall not be installed in a pit, basement or similar location where heavier-than-air-gas might collect. Appliances so fueled shall not be installed in an above-grade under-floor space or basement unless such location is provided with an approved means for removal of unburned gas.”

Consult Chapter 5 of the 1994 UNIFORM MECHANICAL CODE or CAN/CGA B149.2 - M95 or latest edition for propane for design criteria of the “approved” means for removal of unburned gas.

SAFETY—
KEEP THE BOILER AREA CLEAR AND FREE FROM COMBUSTIBLE MATERIALS, GASOLINE AND OTHER FLAMMABLE VAPORS AND LIQUIDS.

MINIMUM CLEARANCES

A. Minimum clearances to the exterior surfaces of the boiler shall be as follows:
MINIMUM ALCOVE AND CLOSET CLEARANCE

Surface	For Combustible Construction	Recommended for Service
Front	152 mm (6")	457 mm (18")
Bottom	305 mm (12")	305 mm (12")
Left Side	51 mm (2")	457 mm (18")
Right Side	51 mm (2")	457 mm (18")
Top	76 mm (3")	76 mm (3")
Flue Connector	76 mm (3")	152 mm (6")

B. Provide 457 mm (18") on sides used for passage.
C. All minimum clearances shown above must be met. This may result in increased values of some minimum clearances in order to maintain the minimum clearances of others.
D. Clearance from hot water pipes shall be 25 mm (1”) **.

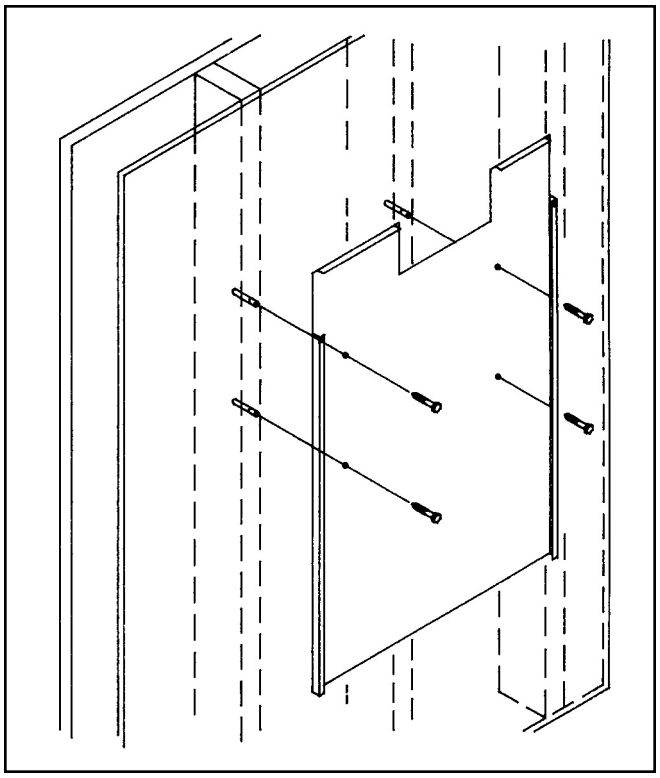
** At points where hot water pipes emerge from a floor, wall or ceiling, the clearance at the opening through the finished floor boards or wall or ceiling boards may not be less than 13 mm (1/2”). Each such opening shall be covered with a plate of noncombustible material.

WALL MOUNTING BOILER

Before installing the boiler on the wall, review the following parameters and decide on a location which will allow all of their requirements to be met:

1. Boiler location requirements on page 3.
2. Connections to electrical, gas, and water supply.
3. Venting application - Direct Vent or Category IV.
4. Direction which venting will exit boiler - through rear wall or to either side of jacket.
   a. For rear wall venting, the wall passage cutout should be made prior to mounting the boiler.
   b. For venting out through the side of the boiler jacket, the wall (or roof) cutout can be made after mounting the boiler. The boiler jacket has removable panels on either side for vent piping passage.

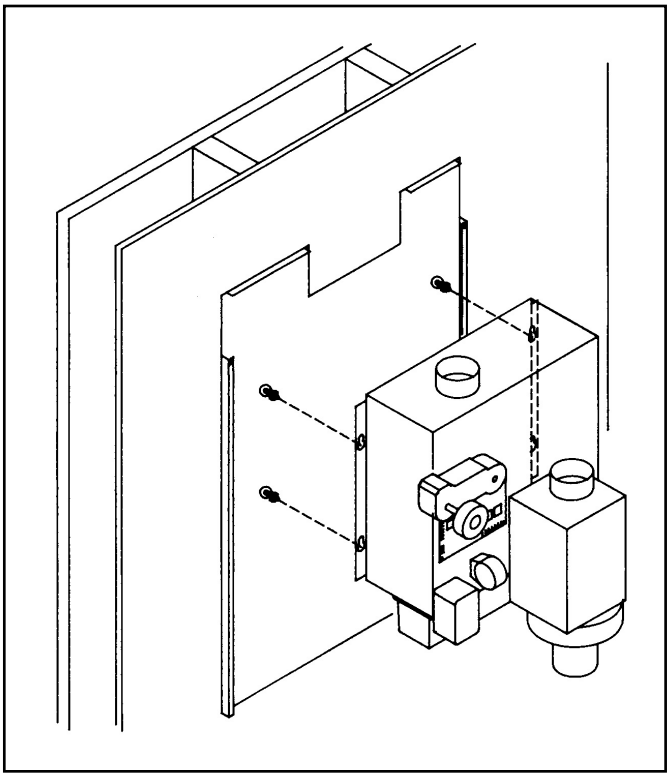
Figure 2. Securing wall panel



TO INSTALL BOILER ON WALL:

1. Hold mounting panel on wall (with the boiler mounting studs facing out) in the location where boiler will be positioned and level wall panel. If the wall is of frame construction, locate wall studs for mounting.
2. Mark the mounting bolt holes for wall panel on wall. If the boiler is to be vented directly out the back of the wall, use the cutout in the top of the mounting panel to mark the rectangular vent cutout on wall.
3. Drill mounting bolt holes for wall panel. Cut the opening through rear wall, if used, and do all finishing work.
4. Secure the mounting panel (see Figure 1) to wall using appropriate hardware: 8 mm (5/16") lag bolts (provided) for frame construction wall studs; 8 mm (5/16") wall anchors or expansion plugs if construction is other type.
5. Place hex nuts (provided) loosely on the ends of boiler mounting studs on mounting panel. (See Figure 2) Two keyhole-shaped slots are provided on each side of the boiler rear which allow hex nuts (on studs) to pass through slots. Lift the boiler and seat it on the mounting studs. Tighten hex nuts securely.

Figure 3. Securing boiler



APPROVED VENTING APPLICATIONS

This Prodigy 21 boiler is approved to be vented using Direct vent or Category IV applications. These applications are differentiated as follows:

Direct vent — The air for combustion is piped directly to the air intake of the boiler from outdoors. The vent piping may be run horizontally or vertically to the outdoors, to a common terminal with the combustion air intake or separate from the combustion air intake means.

Category IV— The air for combustion is taken from the ambient air surrounding the boiler. The vent piping may be run horizontally or vertically to the outdoors. The vent pressure is typically positive in this application.

The following venting installation requirements are divided into 2 sections, each pertaining to the 2 different applications described above. Once the appropriate venting application has been selected, follow only the requirements specified under that section for venting the boiler. **These requirements must be carefully read and followed in order to avoid any hazardous conditions due to improper installation of the flue gas venting system.**

DIRECT VENTING REQUIREMENTS

VENT LOCATION

Vent installations shall be in accordance with Part 7, Venting of Equipment, of the National Fuel Gas Code, ANSI Z223.1, or CAN/CGA B149.1 - M95 or latest edition for natural gas, and CAN/CGA B149.2 - M95 or latest edition for propane.or applicable provisions of local building codes.

Vent termination must meet the following clearances: Minimum of 305 mm (12") above grade and normal snow line to vent terminal bottom; minimum of 305 mm (12") from any building opening; minimum of 914 mm (3 feet) above any forced air intake located within 3048 mm (10 feet); minimum of 1219 mm (4 feet) horizontally from, and in no case above or below, unless 1219 mm (4-foot) horizontal distance is maintained, from electric or gas meters, regulators and relief equipment.

Vent termination must not be located over any public walkway, in any confined space (i.e. window wells, alcoves, narrow alleys) or under any overhang or deck. Vent termination should not allow flue gas discharge towards neighbor's windows or where personal injury or property damage can occur.

DO NOT install the vent into a common venting system. DO NOT install a vent damper or similar device in vent tubing or on the boiler.

VENT MATERIAL

A. DO NOT use galvanized or plastic vent system materials. The vent system for direct vent applications must be CUL listed 76 mm (3") diameter corrosion resistant stainless steel. The following manufacturers' systems are approved for use within a specified minimum and maximum equivalent vent length for each model of boiler. Refer to Slant/Fin Parts List.

APPROVED VENT MANUFACTURERS' SYSTEMS

76 mm (3") diameter vent system restrictions:

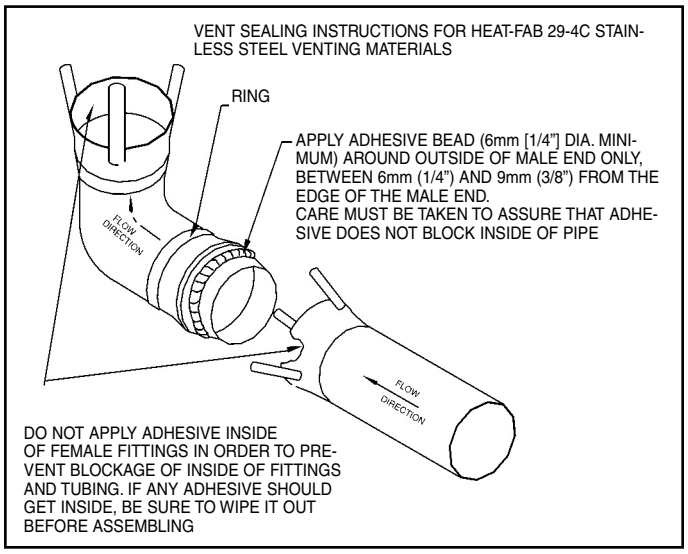
Manufacturer	Equivalent length of each 90° elbow
Heat Fab Saf-T Vent	914 mm (3 ft.)
Protech Fas-N Seal	1829 mm (6 ft.)
Flex-L Star 34	1829 mm (6 ft.)

1. The maximum equivalent length for both models is 30.5 m (100 feet) (includes elbows).
2. The minimum quantity of venting for both models is one elbow plus the length required to pass through back wall to the termination.
3. Up to (5) 90° elbows may be used over the length of the vent system, provided the proper pitch is maintained in the vent system to prevent condensate accumulation.

B. When joining the various components of the above listed vent systems, the manufacturers' instructions should be closely followed to insure proper sealing. Use GE-RTV106 or Dow-Corning 732 sealant for sealing of pipe and fittings. See Figure 4 for proper application of vent pipe sealant.

C. All vent connections must be liquid and pressure tight.

Figure 4. Vent sealing instructions
(Consult vent manufacturer's instructions.)


VENT SEALING INSTRUCTIONS FOR HEAT-FAB 29-4C STAINLESS STEEL VENTING MATERIALS
RING
APPLY ADHESIVE BEAD (6mm [1/4"] DIA. MINIMUM) AROUND OUTSIDE OF MALE END ONLY, BETWEEN 6mm (1/4") AND 9mm (3/8") FROM THE EDGE OF THE MALE END.
CARE MUST BE TAKEN TO ASSURE THAT ADHESIVE DOES NOT BLOCK INSIDE OF PIPE
FLOW DIRECTION
FLOW DIRECTION
DO NOT APPLY ADHESIVE INSIDE OF FEMALE FITTINGS IN ORDER TO PREVENT BLOCKAGE OF INSIDE OF FITTINGS AND TUBING. IF ANY ADHESIVE SHOULD GET INSIDE, BE SURE TO WIPE IT OUT BEFORE ASSEMBLING

AIR INTAKE

A. 76 mm (3”) diameter PVC piping materials are recommended. Sewer and drain type material or PVC Schedule 40 piping are best suited for connection to boiler and vent terminal. Use 76 mm (3”) PVC fitting provided with vent kit to adapt PVC Schedule 40 air intake tubing to air filter box collar. The fitting provided will fit onto the filter box collar and then a Schedule 40 76 mm (3”) coupling will fit over that.
B. The venting length requirements specified in this section also apply to the air intake piping.
C. Seal all joints on air intake piping using appropriate sealants.

VENTING INSTALLATION

A. Follow the vent material manufacturer’s instructions in conjunction with these instructions for venting system installation.
B. Refer to Figures 4, 5 and 9 which illustrate some of the requirements for venting in a typical installation.
C. On all installations other than where the vent passes through the wall directly out the back of the boiler, a condensate drain and drain trap MUST be installed on the flue tubing, see Figure 5. The condensate drain should be installed close to the boiler, as shown, and must be equipped with a trap formed by attaching 10 mm (3/8") I.D. clear plastic tubing to the drain assembly, making a loop approximately 102 mm (4") diameter and securing with cord or a tie wrap where the loop crosses over itself. This loop should then be filled with water to form a liquid-filled trap. DO NOT OPERATE THE BOILER WITHOUT INSTALLING THIS TRAP AND FILLING WITH WATER TO PREVENT FLUE GAS DISCHARGE INTO SPACE. Periodic inspection should be made of this assembly for deterioration of the tubing and to insure that the trap is filled with water, but not plugged. If it is plugged or appears to have excessive sediment in it, it should be removed from the drain assembly, straightened out to clear the obstruction, reformed, filled with water and reinstalled as before. The drain must extend to a floor drain.
D. The horizontal pipe must be sloped UPWARD from the boiler, at a pitch of 20 mm/m (1/4” per 1 foot) of run, so that the condensate from the vent system runs to the drain trap. The horizontal portion must also be supported with 19 mm (3/4”) pipe strap at intervals no greater than 1829 mm (6 feet).
E. The vertical portion of the pipe must be supported in at least one location for each 9 m (30 feet) of vertical run. A firestop is required for each wall, ceiling and floor penetration.
F. Use tabs on vent collar to secure stainless steel vent tubing to the boiler.
G. Venting is approved for combustible wall passage through a 102 mm (4”) minimum to 305 mm (12”) maximum thick wall, providing a thimble is used.

Figure 5. Typical direct vent side passage

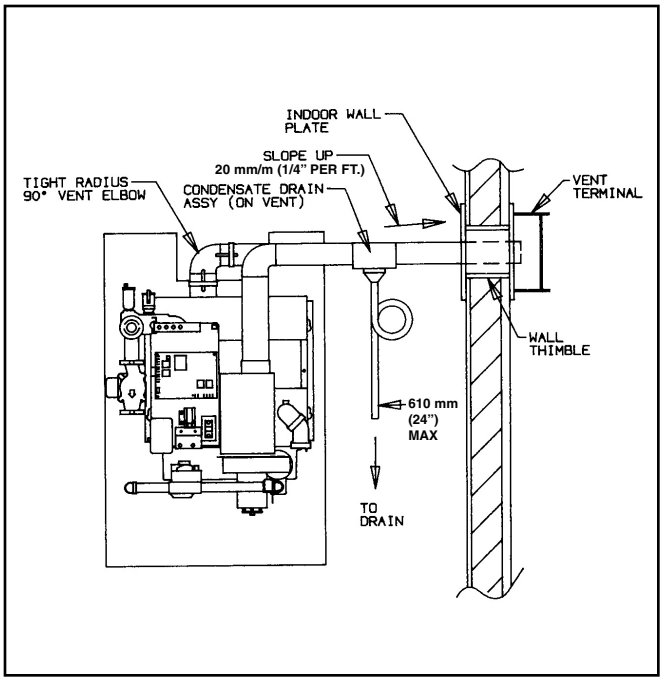
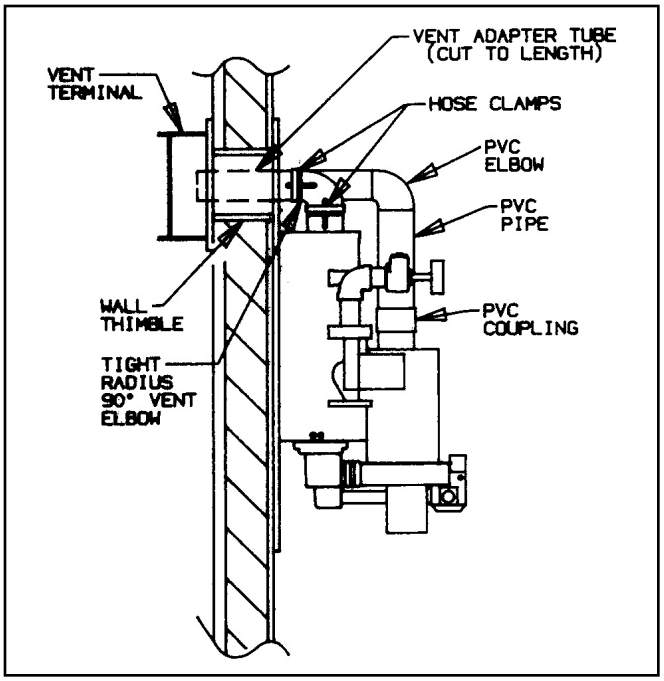


Figure 6. Typical direct vent rear passage



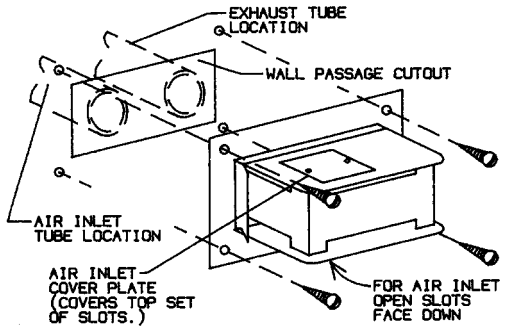
DIRECT VENTING WITH VENT TERMINAL

All Prodigy 21 boiler models are certified for horizontal direct venting utilizing the vent terminal provided by Slant/Fin only.

This vent terminal must be mounted on a vertical wall outside surface. Terminal CANNOT be mounted on a roof or any horizontal surface.

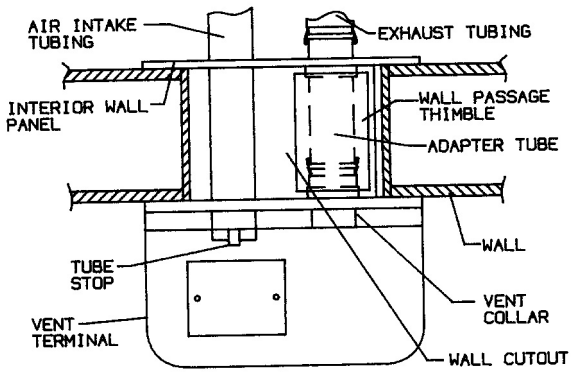
Vent terminal is designed to deflect flue gases from outside building wall; properly installed, it will prevent flue gas degradation of normal building materials and reduce the possibility of air intake freeze-up. It is recommended to utilize this vent terminal on direct vent applications whenever the installation permits.

Figure 7. Vent terminal orientation


EXHAUST TUBE LOCATION
WALL PASSAGE CUTOUT
AIR INLET TUBE LOCATION
AIR INLET COVER PLATE (COVERS TOP SET OF SLOTS.)
FOR AIR INLET OPEN SLOTS FACE DOWN

Shown with air inlet to the left of exhaust from outside view.

Figure 8. Vent terminal installation



Shown from top view.

VENT TERMINAL INSTALLATION

Warning: The vent terminal provided is to be used for horizontal venting only. DO NOT alter this part in any manner other then as shown in these instructions. Only mount on a vertical surface. DO NOT use when vertically venting through a roof or chimney.

1. Wall cutout opening:
   a) On installations where vent passes through the wall directly out the back of boiler, follow directions on page 4.
   b) On installations where vent passes out through side of boiler jacket, cut out a rectangular opening 140 mm (5½") high and 279 mm (11") wide in the appropriate location of an exterior wall. Be sure that this location will allow for the connection of vent materials that come in fixed lengths, or an adjustable connector will be needed.
2. Vent terminal orientation: see Figure 7.
   a) The open slots for the air intake on the vent terminal must face downward.
   b) The air inlet cover plate must face upward to insure that rain, debris and flue gases do not enter the air inlet.
3. Vent and air intake tubing orientation: see Figure 7.
   a) Air inlet tubing may be located to the left or to the right of the flue exhaust tubing.
   b) If the air inlet tubing is going to be to the left of the flue exhaust (viewed from outside of building) then the vent terminal should be installed as supplied without alteration.
   c) If the air inlet tubing is going to be to the right of the flue exhaust (viewed from outside building) then the air inlet cover plate must be removed and reinstalled over the alternate set of slots. *This alteration will insure that the air inlet slots face down when the vent terminal is installed.*
4. Vent terminal installation: see Figure 8.
   a) Center the vent terminal over the wall cutout. The collar on the back of the vent terminal panel should clear the cutout edges by about 13 mm (1/2").
   b) Mark and drill out the location of the four screw holes in the wall for mounting vent terminal.
   c) Seal the vent collar adapter tube (76 mm (3") dia. male end stainless) into the collar on the back of the vent terminal box and slide the ring on the tube over the collar tabs, then bend the tabs back over the ring. This piece will allow easy connection of the flue exhaust tubing from inside the building. On installations where vent passes through the wall directly out of the back of boiler, measure the length of the tube needed to fit into the elbow on the boiler flue collar. This piece can be cut to length as required. Insert the cut end into the elbow and secure with tabs and hose clamp after vent terminal is installed.
   d) Run a bead of silicone around the perimeter of wall panel and vent collar to prevent water and drafts from entering building.
   e) Position the vent terminal on the wall as described in Step 2 and secure it to the wall.
5. Interior wall panel installation:
   a) Cut the wall thimble (127 mm (5") diameter galv. pipe) about 13 mm (1/2") shorter than the wall thickness.
   b) Fit thimble onto the collar on the back of the vent terminal inside the wall.
   c) Hold the interior wall panel up to the wall cutout and fit the collar on this panel into the thimble. Line up the air inlet holes and secure to wall.
6. Vent and air intake tubing installation to vent terminal:
   a) Finish tubing connections back to the boiler, following the requirements in the venting installation instructions on pages 5 and 6.
   b) Exhaust tubing connects to the vent collar adapter tube. Observe correct flow direction.
   c) Air intake tubing should slip into the air inlet opening in the back of the vent terminal. Make sure the tubing extends into the vent terminal box as far as the tube stop inside the box allows (19 mm (3/4") approx.). Seal around the air intake tubing where it passes through the outside wall plate.

DIRECT VENTING WITHOUT VENT TERMINAL

Vertical venting configurations

All Prodigy 21 boiler models are certified for vertical direct venting utilizing the following configurations.

1. Vent and air intake piping vertically run up through a roof in close proximity.
   a. For a pitched roof installation, refer to Figure 10. For a flat roof installation, refer to Figure 11. When floor and ceiling passage is necessary, refer to Figure 9. Adhere to all clearances and materials specified in these illustrations.
   b. The stainless exhaust vent pipe must pass through the roof vertically through a 178 mm (7") min. diameter cutout and appropriate roof flashing. The pipe must exhaust straight up and terminate with a screen terminator.
   c. The air intake pipe must pass through the roof vertically. The cutout does not require any clearance, but must be sealed with a flashing or other means. The air intake opening must face down by using a 180° elbow with a screen positioned at the opening. The air intake opening must be at least 305 mm (1 foot) below the vent opening.

Figure 9. Floor and ceiling venting passage
All items shown below are REQUIRED. All vent joints must be LIQUID and PRESSURE TIGHT.

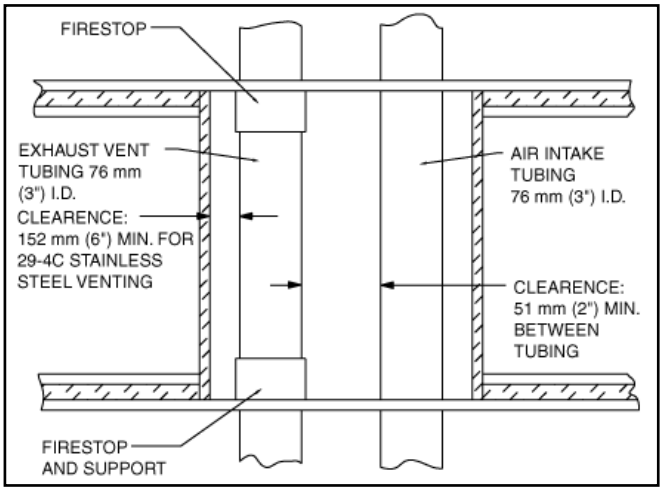

FIRESTOP
EXHAUST VENT TUBING 76 mm (3") I.D.
CLEARENCE: 152 mm (6") MIN. FOR 29-4C STAINLESS STEEL VENTING
AIR INTAKE TUBING 76 mm (3") I.D.
CLEARENCE: 51 mm (2") MIN. BETWEEN TUBING
FIRESTOP AND SUPPORT

Figure 10. Vent and air intake run through a pitched roof

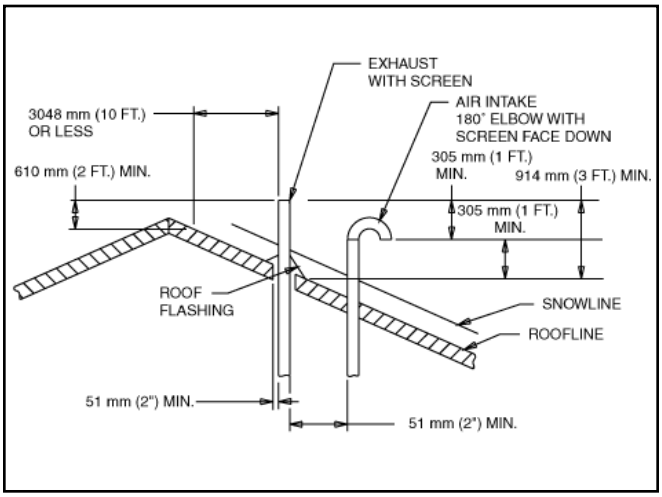
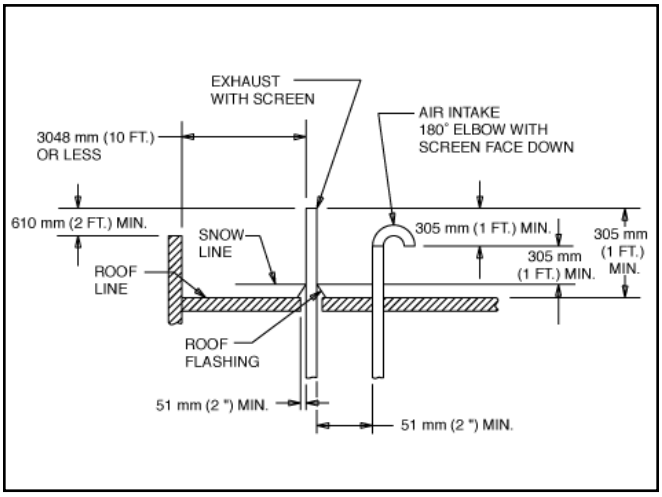

EXHAUST WITH SCREEN
AIR INTAKE 180° ELBOW WITH SCREEN FACE DOWN
3048 mm (10 FT.) OR LESS
610 mm (2 FT.) MIN.
305 mm (1 FT.) MIN.
914 mm (3 FT.) MIN.
305 mm (1 FT.) MIN.
ROOF FLASHING
SNOWLINE
ROOFLINE
51 mm (2") MIN.
51 mm (2") MIN.

Figure 11. Vent and air intake run through a flat roof


EXHAUST WITH SCREEN
AIR INTAKE 180° ELBOW WITH SCREEN FACE DOWN
3048 mm (10 FT.) OR LESS
610 mm (2 FT.) MIN.
SNOW-LINE
ROOF LINE
305 mm (1 FT.) MIN.
305 mm (1 FT.) MIN.
305 mm (1 FT.) MIN.
ROOF FLASHING
51 mm (2 ") MIN.
51 mm (2 ") MIN.

2. Vent piping run vertically up through a roof and air intake run horizontally out a vertical wall.
   a. See Figure 12 for general configuration. For a pitched roof installation, refer to vent pipe requirements shown in Figure 10. For a flat roof installation, refer to the vent pipe requirements shown in Figure 11. When floor and ceiling passage is necessary, refer to Figure 9. Adhere to all clearances and materials specified in these illustrations for installing the vent pipe only. For installing the air intake pipe, refer to the air intake requirements shown in Figure 12.
   b. The stainless exhaust vent pipe must pass through the roof vertically through a 178 mm (7") min. diameter cutout and appropriate roof flashing. The pipe must exhaust straight up and terminate with a screen terminator.
   c. The air intake pipe must pass through a vertical wall or foundation horizontally. The cutout does not require any clearance, but must be sealed with a flashing or by other means. The air intake opening must face down by using 90° elbow with a screen positioned at the opening.

3. Vent piping run vertically up an existing chimney and air intake run horizontally out a vertical wall.
   a. Refer to Figure 13. Adhere to all clearances and materials specified in this illustration.
   b. The stainless exhaust vent pipe must extend the total length of the chimney. The pipe must exhaust straight up and terminate with a screen terminator. The top of the chimney must be sealed off around the protruding pipe with an appropriate plate or flashing. Other appliances CANNOT be vented into the same chimney or vent pipe within the chimney.
   c. The air intake pipe must pass through a vertical wall or foundation horizontally. The cutout does not require any clearance, but must be sealed with a flashing or by other means. The air intake opening must face down by using a 90° elbow with a screen positioned at the opening.

Figure 12. Vent run through a roof and air intake run through a wall

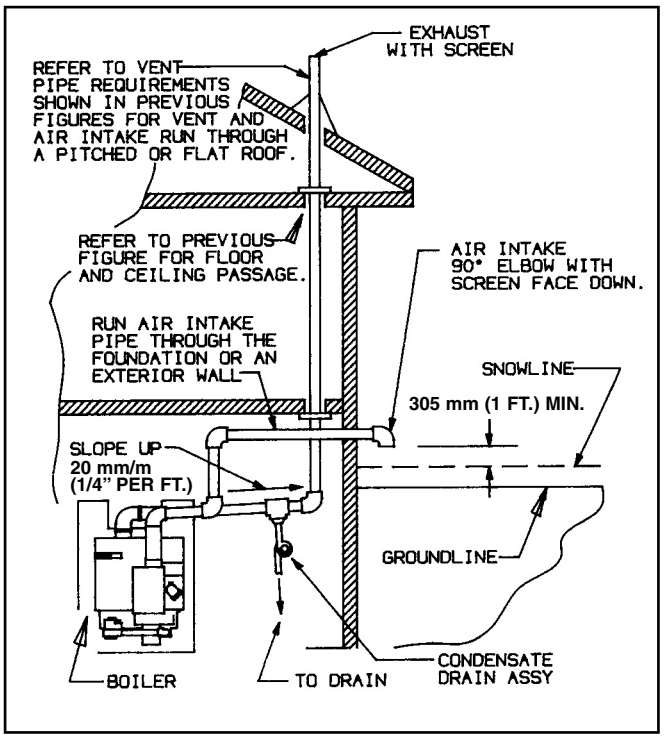
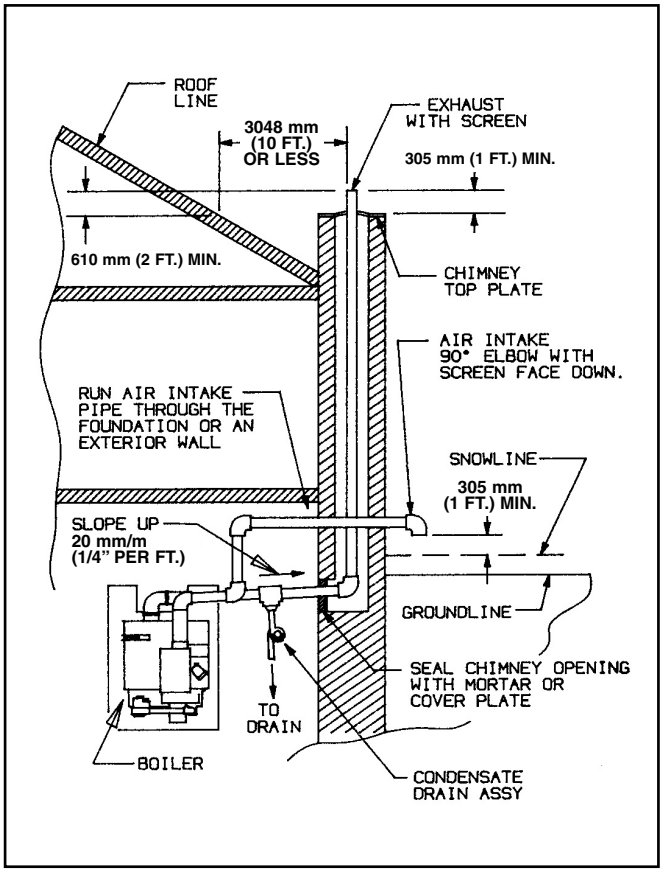


Figure 13. Vent piping run vertically up an existing chimney and air intake run horizontally out a vertical wall



CATEGORY IV VENTING REQUIREMENTS

BOILER ROOM AIR SUPPLY AND VENTILATION

An ample supply of air is required for combustion and ventilation. When buildings are insulated, caulked and weather-stripped, now or later on, direct openings to outside may be required and should be provided. If the boiler is not near an outside wall, air may be ducted to it from outside wall openings.

Provisions for combustion and ventilation air must be made in accordance with section 5.3, Air for Combustion and Ventilation, of the National Fuel Gas Code, ANSI Z223.1-latest edition, or CAN/CGA B149.1 - M95 or latest edition for natural gas, and CAN/CGA B149.2 - M95 or latest edition for propane or applicable provisions of the local building codes. The following recommendation applies to buildings of energy-saving construction, fully caulked and weather-stripped:

Provide one GRILLED opening near the floor and one near the ceiling on an outside wall near the boiler (or duct from such openings to the boiler), EACH opening to be a minimum of 645 mm^2 (one square inch) per 293 W (1000 Btuh) input to ALL APPLIANCES in the area. For a total appliance input of 58,620 W (200,000 Btuh), each opening will be 64 516 mm^2 (100 square inches). A grilled opening 254 mm x 254 mm (10"X10") has 64 516 mm^2 (100 square inches) of area. If fly screen must be used over openings, double the area and inspect and clean the screen frequently.

Openings must NEVER be reduced or closed. If doors or windows are used for air supply, they must be locked open. Protect against closure of openings by snow and debris. Inspect frequently.

No mechanical draft exhaust or supply fans are to be used in or near the boiler area.

The flow of combustion and ventilating air to the boiler must not be obstructed.

VENT LOCATION REQUIREMENTS

Vent installations shall be in accordance with Part 7, Venting of Equipment, of the National Fuel Gas Code, ANSI Z223.1, or CAN/CGA B149.1 - M95 or latest edition for natural gas, and CAN/CGA B149.2 - M95 or latest edition for propane or applicable provisions of local building codes.

This Prodigy 21 boiler is approved for pressure venting both horizontally and vertically. The following requirements apply to both types of venting installation.

Vent termination must meet the following clearances: Minimum of 305 mm (12”) above grade and normal snow line to vent termination bottom; minimum of 1219 mm (4 feet) below or horizontally, or 305 mm (1 foot) above any building opening; minimum of 914 mm (3 feet) above any forced air intake located within 3048 mm (10 feet); minimum of 1219 mm (4 feet) horizontally from, and in no case above or below, unless 1219 mm (4-foot) horizontal distance is maintained, from electric or gas meters, regulators and relief equipment.
Vent termination must not be located over any public walkway, in any confined space (i.e. window wells, alcoves, narrow alleys) or under any overhang or deck. Vent termination should not allow flue gas discharge towards neighbor's windows or where personal injury or property damage can occur.

DO NOT install the vent into a common venting system. DO NOT install a vent damper or similar device in vent tubing or on the boiler.

VENT MATERIAL REQUIREMENTS

A. DO NOT use galvanized or plastic vent system materials. The vent system for Category IV applications must be CUL listed 76 mm (3”) diameter corrosion resistant stainless steel. The following manufacturers’ systems are approved for use within a specified minimum and maximum equivalent vent length for each model of boiler. Refer to Slant/Fin parts list.

APPROVED VENT MANUFACTURERS’ SYSTEMS

Manufacturer	Equivalent length of each 90° elbow
Heat Fab Saf-T Vent	914 mm (3 ft.)
Protech Fas-N Seal	1829 mm (6 ft.)
Flex-L Star 34	1829 mm (6 ft.)

76 mm (3") diameter vent system restrictions:

1. The maximum equivalent length for both models is 30.5 m (100 feet) (includes elbows).
2. The minimum quantity of venting for both models is one elbow plus the length required to pass through back wall to the termination.
3. Up to (5) 90° elbows may be used over the length of the vent system, provided the proper pitch is maintained in the vent system to prevent condensate accumulation.

B. When joining the various components of the vent systems listed on page 10, the manufacturers' instructions should be closely followed to insure proper sealing. Use GE-RTV106 or Dow-Corning 732 sealant for sealing of pipe and fittings. See Figure 4 for proper application of vent pipe sealant.
C. All vent connections must be liquid and pressure tight.

VENT INSTALLATION

A. Follow the vent material manufacturer's instructions in conjunction with these instructions for venting system installation.
B. Refer to Figures 4 and 14 which illustrate some of the requirements for venting in a typical installation.
C. A condensate drain and drain trap MUST be installed on the flue tubing, see Figure 14. The condensate drain should be installed close to the boiler, as shown, and must be equipped with a trap formed by attaching 10 mm (3/8") I.D. clear plastic tubing to the drain assembly, making a loop approximately 102 mm (4") diameter and securing with cord or a tie wrap where the loop crosses over itself. This loop should then be filled with water to form a liquid-filled trap. DO NOT OPERATE THE BOILER WITHOUT INSTALLING THIS TRAP AND FILLING WITH WATER TO PREVENT FLUE GAS DISCHARGE INTO SPACE. Periodic inspection should be made of this assembly for deterioration of the tubing and to insure that the trap is filled with water, but not plugged. If it is plugged or appears to have excessive sediment in it, it should be removed from the drain assembly, straightened out to clear the obstruction, reformed, filled with water and reinstalled as before. The drain must extend to a floor drain.
D. The horizontal pipe must be sloped UPWARD from the boiler, at a pitch of 20 mm/m (1/4" per 1 foot) of run, so that the condensate from the vent system runs to the drain trap. The horizontal portion must also be supported with 19 mm (3/4") pipe strap at intervals no greater than 1829 mm (6 feet).
E. The vertical portion of the pipe must be supported in at least one location for each 9 m (30 feet) of vertical run. A firestop is required for each wall, ceiling and floor penetration.
F. Use tabs on vent collar to secure stainless steel vent tubing to the boiler.
G. Venting is approved for combustible wall passage through a 102 mm (4") minimum to 305 mm (12") maximum thick wall, providing a thimble is used.

Figure 4. Vent sealing instructions
(Consult vent manufacturer's instructions.)

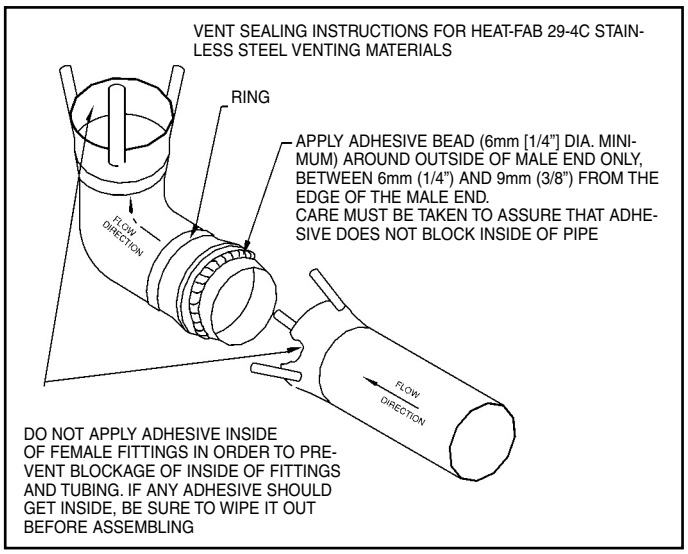

VENT SEALING INSTRUCTIONS FOR HEAT-FAB 29-4C STAINLESS STEEL VENTING MATERIALS
RING
APPLY ADHESIVE BEAD (6mm [1/4"] DIA. MINIMUM) AROUND OUTSIDE OF MALE END ONLY, BETWEEN 6mm (1/4") AND 9mm (3/8") FROM THE EDGE OF THE MALE END.
CARE MUST BE TAKEN TO ASSURE THAT ADHESIVE DOES NOT BLOCK INSIDE OF PIPE
FLOW DIRECTION
FLOW DIRECTION
DO NOT APPLY ADHESIVE INSIDE OF FEMALE FITTINGS IN ORDER TO PREVENT BLOCKAGE OF INSIDE OF FITTINGS AND TUBING. IF ANY ADHESIVE SHOULD GET INSIDE, BE SURE TO WIPE IT OUT BEFORE ASSEMBLING

Figure 14. Typical vent piping from boiler for Category IV

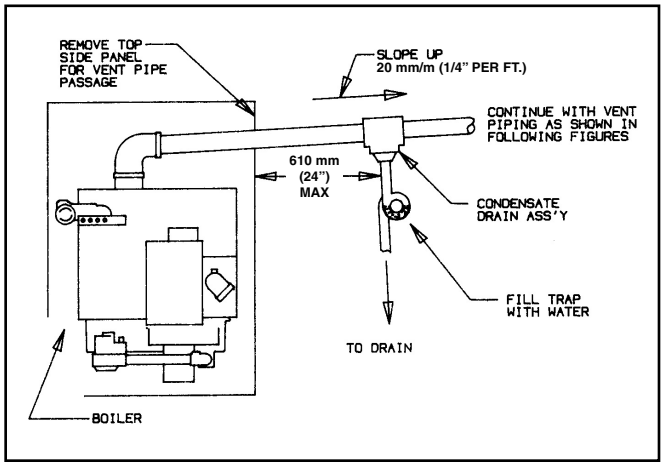

REMOVE TOP SIDE PANEL FOR VENT PIPE PASSAGE
SLOPE UP 20 mm/m (1/4" PER FT.)
CONTINUE WITH VENT PIPING AS SHOWN IN FOLLOWING FIGURES
610 mm (24") MAX
CONDENSATE DRAIN ASS'Y
FILL TRAP WITH WATER
TO DRAIN
BOILER

Figure 15. Vertical Category IV venting through a roof

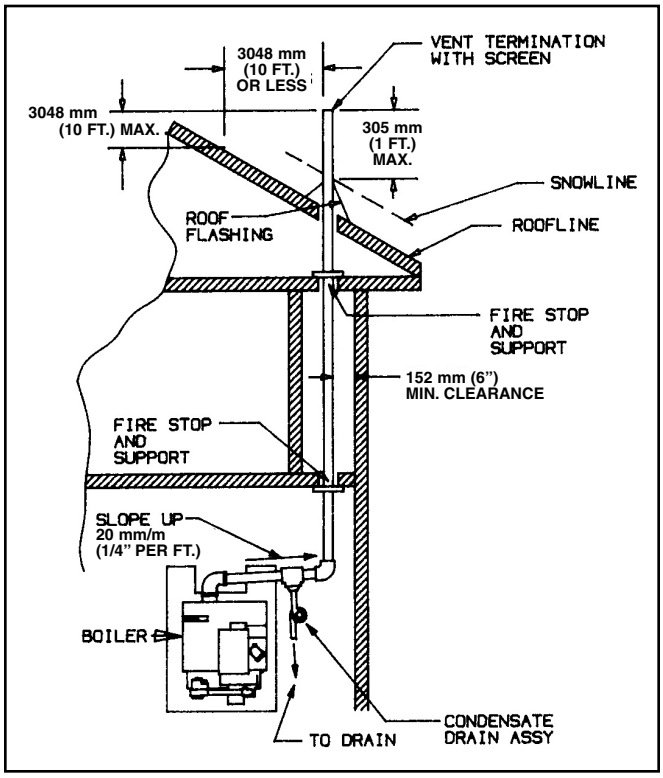
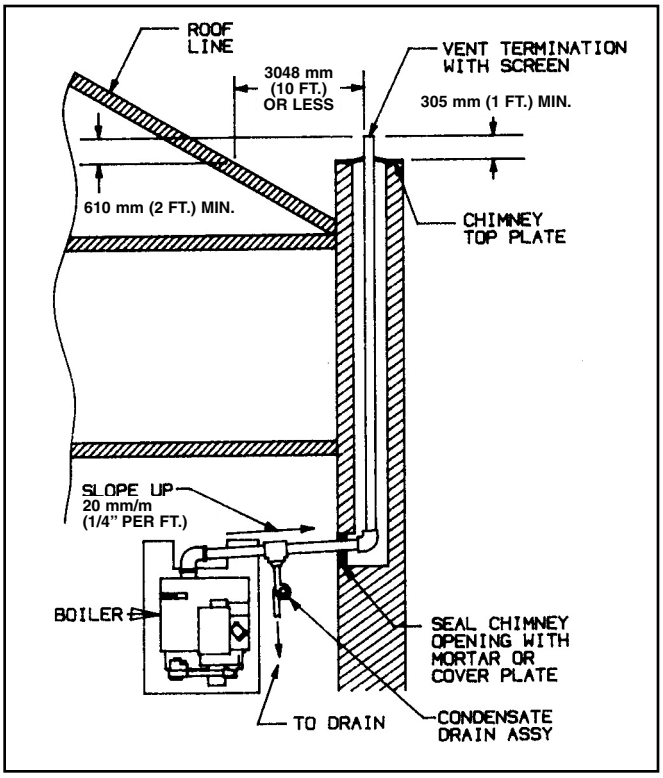


Figure 16. Vertical Category IV venting up an existing chimney

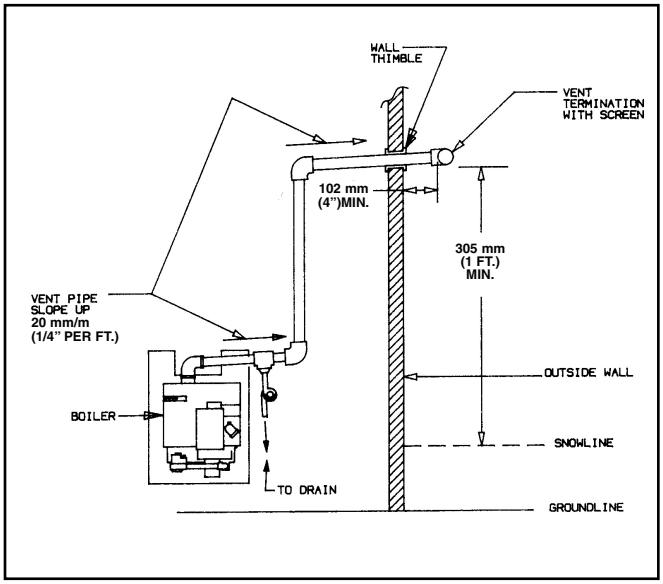


VERTICAL CATEGORY IV VENTING

All Prodigy 21 boiler models are certified for vertical Category IV venting through a roof provided the following conditions are met:

1. For roof passage of vent piping, a UL listed roof flashing must be used.
2. The vent piping must terminate with a screened tee, elbow, straight, or cap termination at the minimum distance from the roof shown in Figure 15.

Figure 17. Horizontal Category IV venting through outside wall



All Prodigy 21 boiler models are certified for vertical Category IV venting up an existing chimney provided the following conditions are met:

1. To utilize an existing chimney as a chase, the vent pipe must extend the total length of the chimney. The top of the chimney must be sealed off around the protruding pipe with an appropriate plate or flashing.
2. The vent piping must terminate with a screened tee, elbow, straight or cap termination at the minimum distance from the roof shown in Figure 16.
3. Other appliances CANNOT be vented into the same chimney or vent pipe within the chimney.

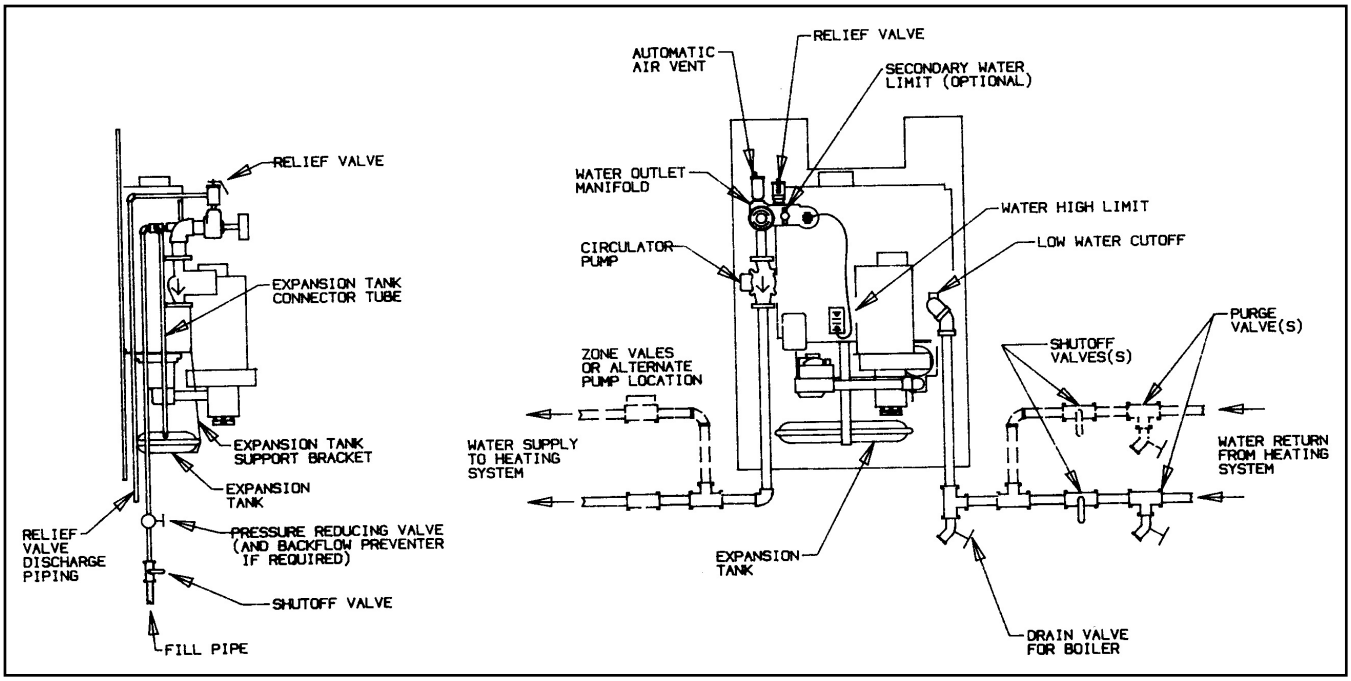
HORIZONTAL CATEGORY IV VENTING

All Prodigy 21 boiler models are certified for horizontal Category IV venting provided the following conditions are met:

1. For combustible wall passage of vent piping, a UL listed thimble must be used, providing the wall thickness is 102 mm (4") minimum to 305 mm (12") maximum.
2. The venting piping must terminate with a screened tee, elbow, or straight termination at the minimum distance from the outside wall shown in Figure 17.

Figure 18. Water piping

Note: Orientation of piping drawn for clarity. Observe relative location of components.



WATER PIPING

Always follow good piping practices. Observe minimum 25 mm (1") clearance to combustibles around all uninsulated hot water pipes or when openings around pipes are not protected by noncombustible materials.

Factory-installed low water cutoff will shut off boiler in the event water falls below the lowest safe water level.

Boiler must not be used in connection with a refrigeration system. If the boiler supplies hot water to heating coils in air handling units, flow control valves or other devices must be installed to prevent gravity circulation of boiler water in the coils during the cooling cycle.

Expansion tank: Install into water outlet manifold as shown in Figure 18. Piping systems with unusually large water volume may require the connection of a larger capacity expansion tank outside of the boiler's enclosure.

Relief valve discharge piping: Use same size or larger piping (iron or copper) than valve outlet. Must terminate 152 mm (6") from floor (or local codes) with a plain (no threads) end. DO NOT hard-pipe to drain piping. Make sure discharge is always visible.

Cold water fill: Pressure reducing (fill) valve and shut-off valve should be installed.

Supply and return: For tapping sizes, see dimensions on page 2. Recommend shut-off valve in supply (and shut-off and drain valves in return on non-zoned system).

Radiant floor and standing cast-iron radiant systems: A boiler by-pass loop (or equivalent) will be required to avoid flue gas condensation on cast-iron sections for low temperature application (i.e. radiant floor systems).

Zone piping: See page 15 for zoning with zone valves and domestic hot water installation.

FILL AND PURGE HEATING SYSTEM

- Make sure flow direction arrows on components are facing in direction of flow.
- Place bucket under pressure relief valve discharge.

Baseboard and radiant floor systems

- Close all shut-off valves, drain valves and air vents.
- Open supply shut-off valve and return drain valve on first zone (or return drain valve on non-zoned system). If zoned with zone valves, manually open zone valve.
- Attach a hose from return drain valve to a drain. Open fill line shut-off valve. Manually operate fill valve regulator. When water runs out of hose in a steady stream (with no air bubbles), close return drain valve.
- Repeat procedure for additional zones (one at a time).
- On completion, open all return shut-off valves.

Standing cast-iron radiation and systems with manual vents at high points

- Close all shut-off valves, drain valves and air vents.
- Open supply and return shut-off valves. If zoned with zone valves, manually open all zone valves.
- Open fill line shut-off valve. Manually operate fill valve regulator. Open pressure relief valve manual operator to fill boiler. When water runs out of discharge pipe in a steady stream (with no air bubbles), close operator.
- Starting with nearest manual air vent, open vent until water flows out; close vent. Repeat procedure, working your way toward farthest air vent.

When finished

- Place fill valve regulator and all zone valve operators in automatic position.
- Check that temperature/pressure gage reads minimum of 83 kPa (12 psi) (fill pressure) cold. If piping system rises more than 4.6 m (16 feet) vertically above boiler, higher fill pressures are required.
- Check for and repair any water leaks.

GAS PIPING

A. Local installation codes apply. The pipe joint compound used on threads must be resistant to the action of liquefied petroleum gases.

B. The gas supply line to the boiler should be run directly from the meter for natural gas or from the fuel tank for L.P. propane gas. See Figure 19 for location of union and manual main shut-off valve that may be specified locally.

Selecting pipe size for natural gas:

1. Measure or estimate the length of piping from the meter to the installation site.
2. Consult gas supplier for heating value of gas - W/m³ (BTU/cu. ft.).
3. Divide boiler rated input by heating value to find gas flow in piping (cu. ft. per hour).
4. Use table below to select proper pipe size.

Example: Boiler model KC-100 is to be installed. Distance from gas meter to the boiler is 12.1 m (40 ft.). Heating value of natural gas is 10 350 W/m³ (1000 BTU/cu. ft.). Select proper pipe size.

$$\text{Gas flow} = \frac{29\,310 \text{ W/hour}}{10\,350 \text{ W/m}^3} = 2.83 \text{ m}^3\text{/hour}$$

$$(\text{Gas flow} = \frac{100{,}000 \text{ BTU/hour}}{1000 \text{ BTU/cu. ft.}} = 100 \text{ cu. ft. per hour})$$

At 12.1 m (40 ft.) length of pipe, match required capacity from table above (choose higher capacity, in this case, 3.7 m³/hour (130 cu. ft. per hour)). Required pipe size is 19 mm (3/4").

Improper gas pipe sizing will result in insufficient heat and other installation difficulties. For more information and also if other appliances are to be attached to the piping system, see Appendix C of National Fuel Gas Code ANSI Z223.1-latest edition or CAN/CGA B149.1 - M95 or latest edition for natural gas, and CAN/CGA B149.2 - M95 or latest edition for propane.

C. The boiler and its gas connection must be leak tested before placing the boiler in operation. Use liquid soap solution for all gas leak testing. DO NOT use open flame.

This boiler and its individual shut-off valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of 3.5 kPa (1/2 PSIG).

This boiler must be isolated from the gas supply piping system by closing its individual manual shut-off valve during any pressure testing of the gas supply piping system at test pressures equal to or less than 3.5 kPa (1/2 PSIG).

D. All gas piping used should be inspected thoroughly for cleanliness before makeup. A sediment trap must be provided, as illustrated in Figure 19.

E. The minimum and maximum gas supply pressure (at the inlet of gas valve) are shown on the boiler rating plate for the type of gas used. Gas supply pressure should never be less than minimum or more than maximum pressure when the boiler or any other appliance is turned on or off.

Length of Pipe		Gas Flow In Piping Pressure Drop = 8mm (.3") in water Specific Gravity = 0.60									
		Iron Pipe Size (Ips)									
		13mm (1/2")		19mm (3/4")		25mm (1")		32mm (1-1/4")		38mm (1-1/2")	
m	ft	m³/hr	cu.ft./hr.	m³/hr	cu.ft./hr.	m³/hr	cu.ft./hr.	m³/hr	cu.ft./hr.	m³/hr	cu.ft./hr.
3.0	10	3.7	132	7.9	278	14.7	520	29.7	1050	45.3	1600
6.1	20	2.6	92	5.4	190	9.9	350	20.7	730	31.1	1100
9.1	30	2.1	73	4.3	152	8.1	285	16.7	590	25.2	890
12.2	40	1.8	63	3.7	130	6.9	245	14.2	500	21.5	760
15.2	50	1.6	56	3.3	115	6.1	215	12.5	440	19.0	670
18.3	60	1.4	50	3.0	105	5.5	195	11.3	400	17.3	610
21.3	70	1.3	46	2.7	96	5.1	180	10.5	370	15.9	560
24.3	80	1.2	43	2.5	90	4.8	170	9.9	350	15.0	530
27.4	90	1.1	40	2.4	84	4.5	160	9.1	320	13.9	490
30.5	100	1.1	38	2.2	79	4.2	150	8.6	305	13.0	460

At pressure drop of 0.3 in. water, specific gravity = 0.60.

Figure 19. Gas piping components location

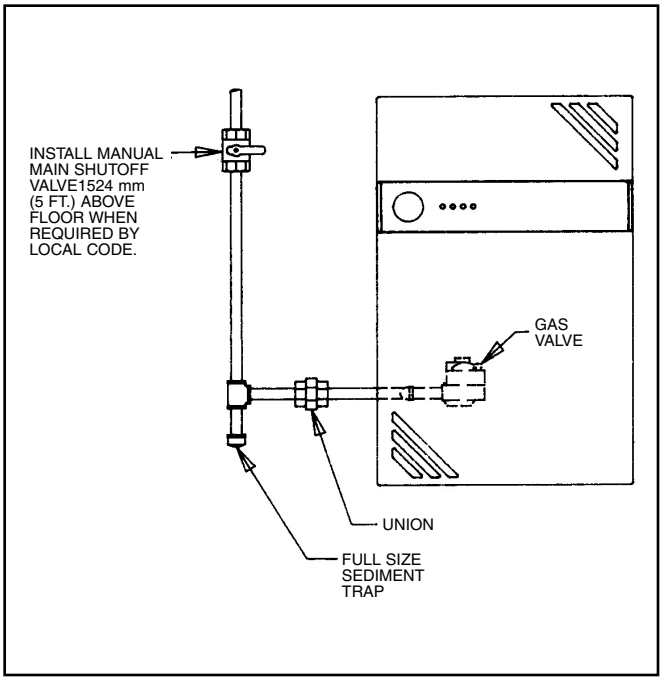
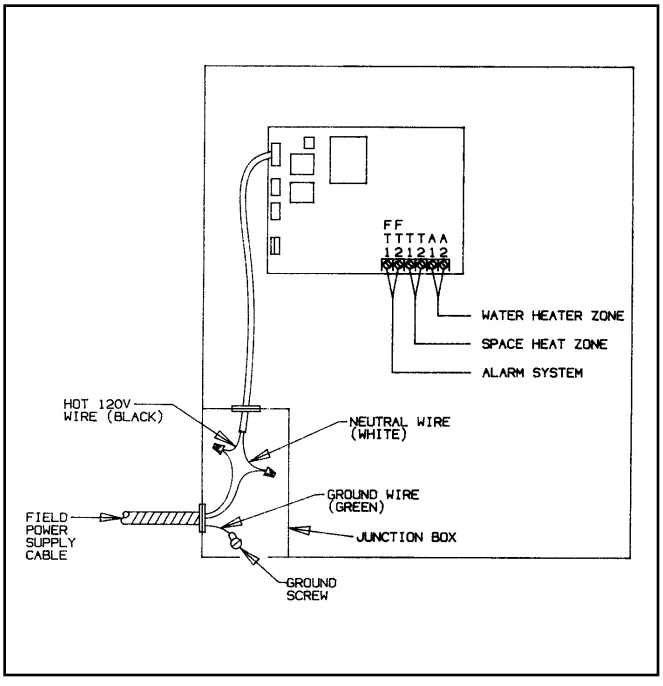

INSTALL MANUAL MAIN SHUTOFF VALVE1524 mm (5 FT.) ABOVE FLOOR WHEN REQUIRED BY LOCAL CODE.
GAS VALVE
UNION
FULL SIZE SEDIMENT TRAP

Figure 20. Power and thermostat wiring



ELECTRICAL WIRING

DANGER: BEFORE WIRING, ALWAYS TURN OFF ELECTRIC POWER SUPPLY. OTHERWISE, SHOCK OR DEATH CAN RESULT.
WARNING: DO NOT USE BOILER TRANSFORMER TO POWER EXTERNAL ACCESSORIES (I.E. ZONE VALVES, RELAYS). OVERLOADED/BURNED-OUT TRANSFORMER CAN RESULT.

Boiler must be electrically grounded in accordance with the requirements of the authority having jurisdiction or, in the absence of such requirements, with the National Electrical Code, ANSI/NFPA 70, or the Canadian Electrical Code - CSA-C22.1, Part 1, latest edition.

Power supply: A separately fused circuit is recommended. Use a standard 15-amp fuse or breaker and 14-gauge conductors in BX cable or conduit.
Thermostat connections: The boiler will run at high or low fire, depending on space heating needs, when the T1 and T2 terminals are closed. Connect low voltage wiring from space heating zones to T1 and T2 terminals on control board. Wire connections to T1 and T2 terminal block must be from an isolated circuit. DO NOT BRING VOLTAGE FROM AN EXTERNAL SOURCE HERE. Wires should be only run from thermostats, zone valve end switches, or circulator end switches. 3 wire zone valves which do not have isolated end switches cannot be used unless a relay is added with the dry contacts wired to T1 and T2.
Thermostat heat anticipator: For zoned system, set to match amp draw of zone valve or circulator relay. For a non-zoned system, set to .3 amps.
Circulator relay on board: DO NOT exceed 5 amp/120V max. rating.

Power Connections

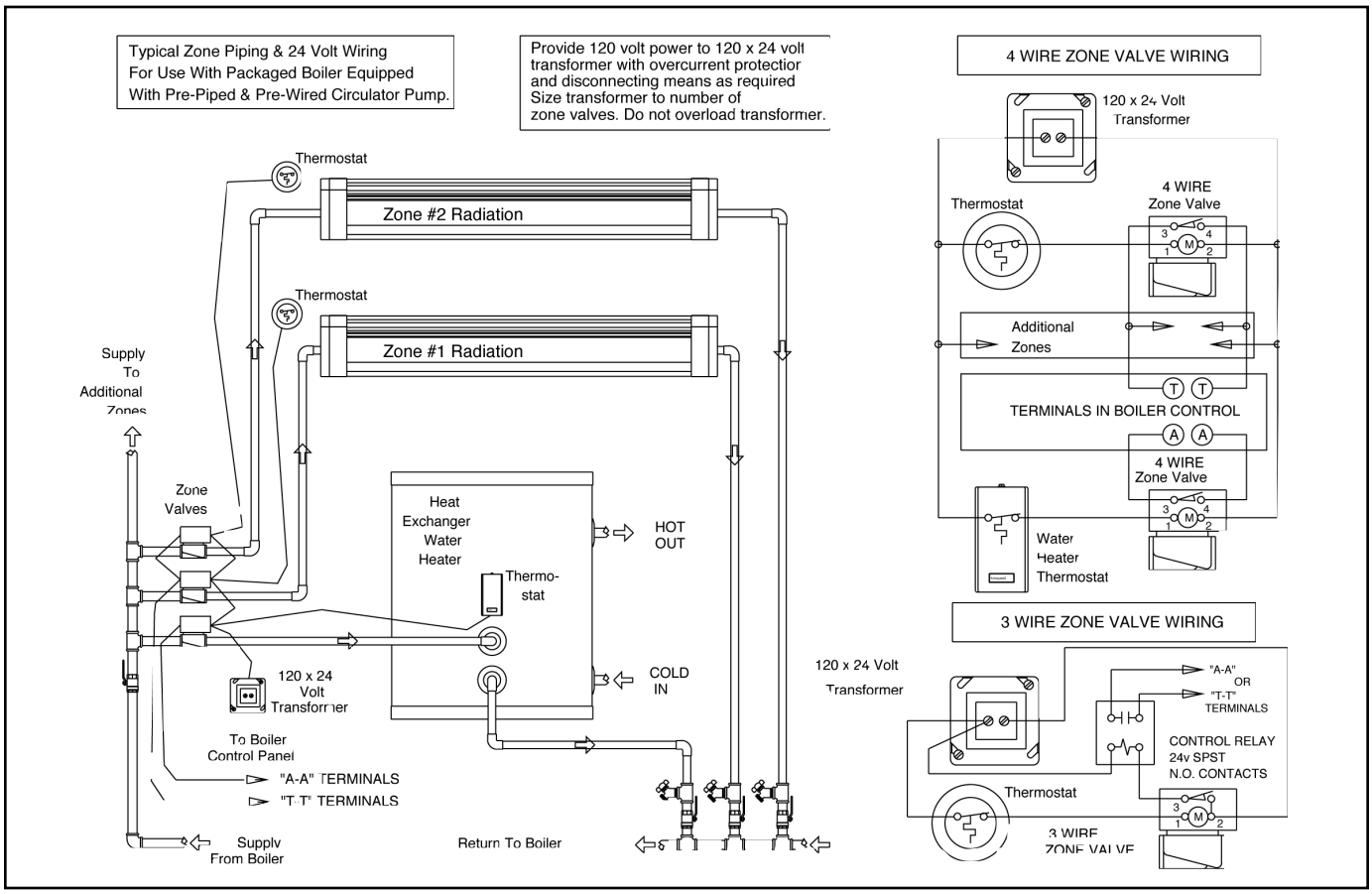
- Remove electrical junction box cover.
- HOT CONNECTION LEAD IS BLACK.
- NEUTRAL CONNECTION LEAD IS WHITE.
- Connect ground inside box.

DO NOT REVERSE POWER CONNECTIONS; if reversed, ignition control will not detect a flame and will go into safety shutdown.

OPTIONS AVAILABLE

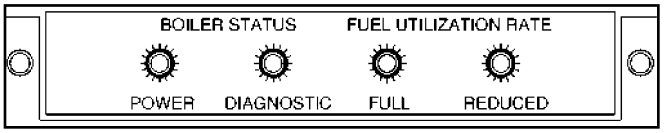
Domestic hot water installation: The boiler will run at high-fire mode for maximum recovery of the Storage Tank when the A1 and A2 terminals are closed. Connect zone valve end switch to A1 and A2 terminals on electronic boiler control board. Water heater thermostat operates zone valve. DO NOT bring power from an external source to these terminals. **Note**: 3 wire zone valves which do not have isolated end switches cannot be used unless a relay is added with the dry contacts wired to T1 and T2.
Alarm system: A remote-type alarm device may be connected to the boiler that will be activated if the boiler shuts down due to a malfunction. FT1 and FT2 terminals on electronic boiler control board are a dry contact (5 amp 120 V max) that makes on a system fault or power outage.

Figure 21: Zone valves (with indirect-fired water heater) piping and wiring


Typical Zone Piping & 24 Volt Wiring
For Use With Packaged Boiler Equipped
With Pre-Piped & Pre-Wired Circulator Pump.
Provide 120 volt power to 120 x 24 volt transformer with overcurrent protectior and disconnecting means as required
Size transformer to number of zone valves. Do not overload transformer.
Thermostat
Zone #2 Radiation
Thermostat
Zone #1 Radiation
Supply To Additional Zones
Zone Valves
Heat Exchanger Water Heater
HOT OUT
Thermo-stat
COLD IN
120 x 24 Volt Transformer
To Boiler Control Panel
"A-A" TERMINALS
"T-T" TERMINALS
Supply From Boiler
Return To Boiler
4 WIRE ZONE VALVE WIRING
120 x 24 Volt Transformer
Thermostat
4 WIRE Zone Valve
Additional Zones
TERMINALS IN BOILER CONTROL
4 WIRE Zone Valve
Water Heater Thermostat
3 WIRE ZONE VALVE WIRING
120 x 24 Volt Transformer
"A-A" OR "T-T" TERMINALS
CONTROL RELAY 24v SPST N.O. CONTACTS
Thermostat
3 WIRE ZONE VALVE

OPERATION PROCEDURES

Figure 22: Indicator Light Panel



LED indicator lights provide important information about boiler operation at a glance. When the CAL/OP selector switch (see Fig. 23) is UP in the OP position, the lights indicate as follows:

Power Indicator (RED): Steady ON means there is electrical power to the boiler. Light will come on when power is provided to boiler.

Diagnostic Indicator (RED): Steady ON or intermittent flashing indicates a system operation problem.

Full Rate Indicator (AMBER): Steady ON means boiler is running in high-fire mode. Light will come on when the boiler starts up; will go off when boiler switches to low-fire mode or shuts off.

Reduced Rate Indicator (GREEN): Steady ON means the boiler is running in low-fire mode. Light will come on when boiler automatically switches to low-fire mode; will go off when boiler returns to high-fire mode or shuts off.

Note: When the CAL/OP selector switch is DOWN in the CAL position, the amber and green lights indicate pressure switch closure at high and low blower speeds.

ELECTRONIC CONTROL BOARD

Operation Selector Switches

Switch #	Position	Operation	Description
1	Down	AUTO	Automatic Boiler Operation
1	Up	MAN	Manual Boiler Operation
2	Down	CAL	Calibration Procedure Blower Runs, Gas Valve WILL NOT OPEN
2	UP	OP	Normal Boiler Operation
3	Down	LO	Low-Fire Operation
3	Up	HI	High-Fire Operation

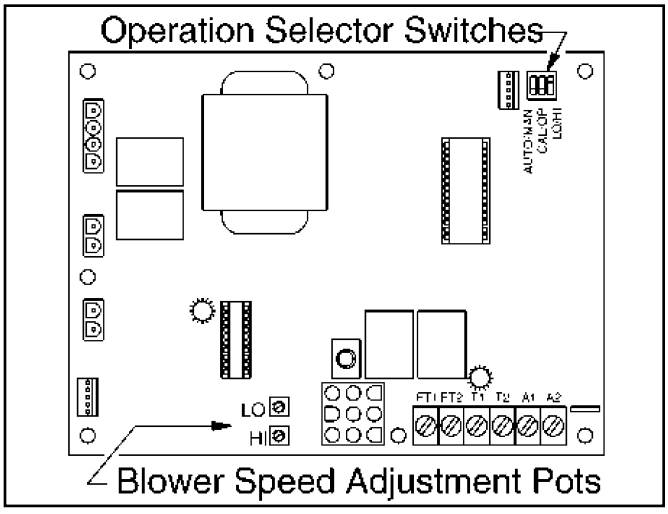


Figure 23: Electronic boiler control board

CALIBRATION EQUIPMENT:

A differential pressure gauge is necessary to calibrate the blower speed and the gas valve to assure the proper air-gas ratio when the boiler is operating.

Pressure measurement fittings: There are 3 service fittings with caps provided on this boiler for convenient calibration of the air/gas ratio and input in the field. See Figure 24 for the location of each.

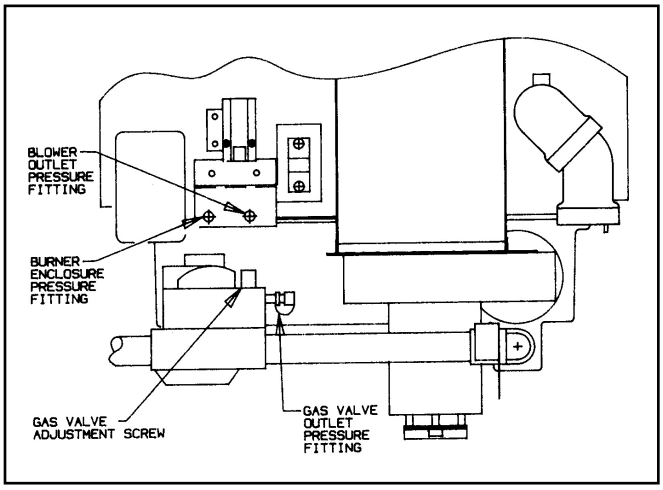
Pressure measurement gauge: Magnehelic or Incline differential pressure gauge with 0 - 25 mm (0 - 1.0") w.c. range and 0.5 mm (0.02") increments recommended.

Available from Slant/Fin is a calibration gauge kit (part number 665185) that has a gauge mounted on a stand with a “toggling” feature which allows the user to switch between the blower and gas valve calibration without moving the tubing connections.

Tubing and connectors for gauge: Need 2 lengths of 5 mm (3/16") I.D. plastic tubing with female adapters which mate to the service fittings.

- Mount gauge securely, within reach of all tubing. Make sure it’s level so the meter indicates “zero” or can be adjusted to do so. HI/LO sides marked on the gau ge.
- Calibration also requires using boiler Operation Selector Switches and Blower Speed Adjustment Pots, located on the Electronic Boiler Control Board (see Figure 23).

Figure 24: Locations of pressure measurement fittings


BLOWER OUTLET PRESSURE FITTING
BURNER ENCLOSURE PRESSURE FITTING
GAS VALVE ADJUSTMENT SCREW
GAS VALVE OUTLET PRESSURE FITTING

Basic Operating Principle

The gas valve on the Prodigy 21 boiler is “coupled” to the combustion blower; so that the gas flow is proportional to the air flow, even under the most adverse conditions. This insures a high level of safety and reliability when the following Operation Procedures are carefully followed. Note that the proper input is obtained by adjusting the combustion blower speed for a certain air flow, which will feed back to the gas valve and produce a proportionate gas flow. See Step A. DO NOT adjust the gas valve adjustment screw to set input rate, only use this adjustment to set the differential pressure between the blower outlet and gas valve outlet to zero as shown in Step B.

STEP A: CALIBRATE BLOWER AIR FLOW

Note: This step will set the air flow required at the proper air/gas ratio for the specified input rate.

- Connect tubing to differential pressure gage as follows:
  1. From Blower Outlet Pressure Fitting to GAGE HI side.
  2. From Burner Enclosure Pressure Fitting to GAGE LO side.

FOR HIGH FIRE OPERATION:

- Set the Operation Selector Switches as follows:

Switch 1 (left)	UP	MAN
Switch 2 (center)	DOWN	CAL
Switch 3 (right)	UP	HI

- Turn power ON. (Red power light and amber full rate light will come on. Blower will start.)
- Allow about 30 seconds for pressure to stabilize.
- Read gage. **Reading should be 25 mm (1.00") w.c.**
- Adjust as necessary. Using HI Blower Speed Adjustment Pot, turn in small increments (clockwise to increase reading or counterclockwise to decrease the reading). Allow to stabilize between adjustments.

FOR LOW FIRE OPERATION:

- Set the Operation Selector Switch 3 to DOWN, LO position. (Amber light goes off, green reduced rate light comes on.)
- Allow about 30 seconds for pressure to stabilize.
- Read gage. **Pressure reading should be 6.35 mm (0.25") w.c.**
- Adjust as necessary. Using LO Blower Speed Adjustment Pot, turn in small increments (clockwise to increase reading or counterclockwise to decrease the reading). Allow to stabilize between adjustments.

Notes on Input Rate:

1. Refer to the Input Rate Specifications Charts on page 2 for the appropriate input rate setting on each model boiler.
2. If a gas meter is available, follow the Step C procedure to verify the specified input rate. If a gas meter is not available, the Step A procedure is adequate for obtaining the specified input rate.
3. For altitudes between 610 and 1372 m (2,000 and 4,500 ft.), derating is not necessary.

STEP B: CALIBRATE GAS VALVE

Note: This step will set the air/gas ratio for optimum combustion. The purpose of this step is NOT to set input rate. Follow Step A and/or Step C to adjust input.

PURPOSE OF GAS VALVE CALIBRATION IS TO ADJUST AIR-GAS RATIO ONLY - NOT INPUT.

- Connect tubing to differential pressure gage as follows:
  1. From Blower Outlet Pressure Fitting to GAGE HI side.
  2. From Gas Valve Outlet Pressure Fitting to GAGE LO side.
- Disconnect any wires from T1, T2 and A1-A2 terminals and set up a jumper wire across T1-T2 terminals to control operation at boiler. Open zone valves.

FOR LOW FIRE OPERATION:

- Set the Operation Selector Switches as follows:

Switch 1 (left)	UP	MAN
Switch 2 (center)	UP	OP
Switch 3 (right)	DOWN	LO

- Open manual main gas shutoff valve and turn boiler gas valve ON.
- Place the jumper across the T1 and T2 terminals.
- After about 20 seconds, boiler will start. (Green reduced rate light on.)
- Allow about 30 seconds for pressure to stabilize.
- Read gage. **Reading should be 0 mm (0") w.c. ±0.25 mm (±0.01").**
- Adjust as necessary. Remove round screw cap covering gas valve adjustment. Position screwdriver into adjustment screw slot carefully. Observe gage while adjusting and turn screw slowly. Turn adjustment screw clockwise to decrease reading if over 0 setpoint. Turn adjustment screw counterclockwise to increase reading if under 0 setpoint.

Note: Remember that the gas pressure is on the low side of the gage. Consequently, decreasing the differential reading actually is INCREASING the gas pressure reading, since the blower outlet pressure is on the high side of the gage and not changing.

FOR HIGH FIRE OPERATION:

- Set Operation Selector Switch 3 (right) to the UP, HI position. (Green light goes off. Amber full rate light comes on.)
- Allow about 30 seconds for pressure to stabilize.
- Read gage. **Pressure reading should be about 0 mm (0") w.c. ±1.25 mm (±0.05").** If reading slightly off “zero”, DO NOT re-adjust gas valve. This would alter the more critical low setting. This step is done only to check boiler rate switching ability.
- REPLACE SCREW COVER ON GAS VALVE ADJUSTMENT. Double check gage reading with cover on.
- Disconnect gage adapters and replace service fitting caps hand tight.
- If gas meter is available, proceed to Step C to check input rate.
- Always be sure to follow the Step E procedure to put boiler back in Automatic Operation after any setup of troubleshooting procedure is complete.

STEP C: CHECK BOILER INPUT RATE

NOTICE: DO NOT USE GAS VALVE TO ADJUST INPUT RATE. FOLLOW DIRECTIONS BELOW.

- Consult gas supplier for heating value of gas (usually 10 350 W/m^3 (1000 Btu/cu.ft.) for NG; 25 875 W/m^3 (2500 Btu/cu.ft.) for LP).
- Place the jumper across the T1-T2 terminals and allow the boiler to operate 10 minutes.
- Shut off all other appliances served by gas meter during timing of input rate.

FOR HIGH FIRE OPERATION: Set the Operation Selector Switches to MAN, OP and HI.

- At meter, observe number of m^3 (cubic feet) of gas the boiler uses in 3 minutes.
- Verify input using following formula:
  m^3 in 3 minutes X heating value X 20 = W/hr input
  (Cu.ft. in 3 minutes X heating value X 20 = BTU/hr input)
  Example:
  0.1274m^3 X 10,350 W/m^3 X 20 = 26,400 W/hr input
  (4.5 cu.ft. X 1000 BTU/cu.ft. X 20 = 90,000 BTU/hr input)

FOR LOW FIRE OPERATION: Set Operation Selector Switch 3 to LO position.

- Allow operation to stabilize.
- At meter, observe number of m^3 (cubic feet) of gas boiler uses in 3 minutes. Verify input using same formula.
  Example:
  0.07 m^3 x 10 350 W/m^3 x 20 = 14 654 W/hr Input
  *(*2.5 cu.ft. x 1000 x 20 = 50,000 Btu/hr Input)

IF ADJUSTMENTS NECESSARY: Turn Blower Speed Adjustment Pot (HI for high-fire or LO for low-fire) in small increments, clockwise to increase input or counterclockwise to decrease input. Allow for stabilization of operation between adjustments.

SYSTEM TESTING

STEP D: CHECK SYSTEM OPERATION

Purge air one final time:

- Let system water reach 160°. Temperature/pressure gage should be between 83 kPa and 172 kPa (12 and 25 psi).
- Bleed all air vents until water squirts out; start on lowest floor with first air vent in the line of flow.

Check exhaust and air intake venting:

- Check for and reseal any vent tubing leaks.
- Check for and remove any vent terminal obstructions.

Check gas valve operation (with burner firing):

USE CAUTION - LINE VOLTAGE PRESENT.

- Disconnect flame sensor wire lead from flame sensor tab. See Fig. 25 for location. Gas valve should close.
- It is normal for boiler to re-try for ignition (3 times) with wire removed from flame sensor, but gas valve should only open for 4 seconds during each re-try and be closed between trials.
- Replace flame sensor wire lead on flame sensor tab.
- If fault shown after trials complete, cycle thermostat or power off/on to clear.

Check high limit operation:

HIGH LIMIT CANNOT BE SET BELOW 82°C (180°F). HIGHEST MAXIMUM ALLOWABLE SETTING IS 104°C (220°F).

- Set thermostat high enough for the water temperature to reach limit switch setting of 82°C (180°F).
- When reached, limit switch should open and gas valve should close.

STEP E: SETUP BOILER FOR AUTOMATIC OPERATION

- Remove jumper from across T1-T2 terminals and reconnect wires to control board T1-T2 and A1-A2 terminals properly.
- Restore zone valves to automatic operation.
- Set thermostat(s) to call for heat.
- Set selector switches to AUTO, OP and HI.

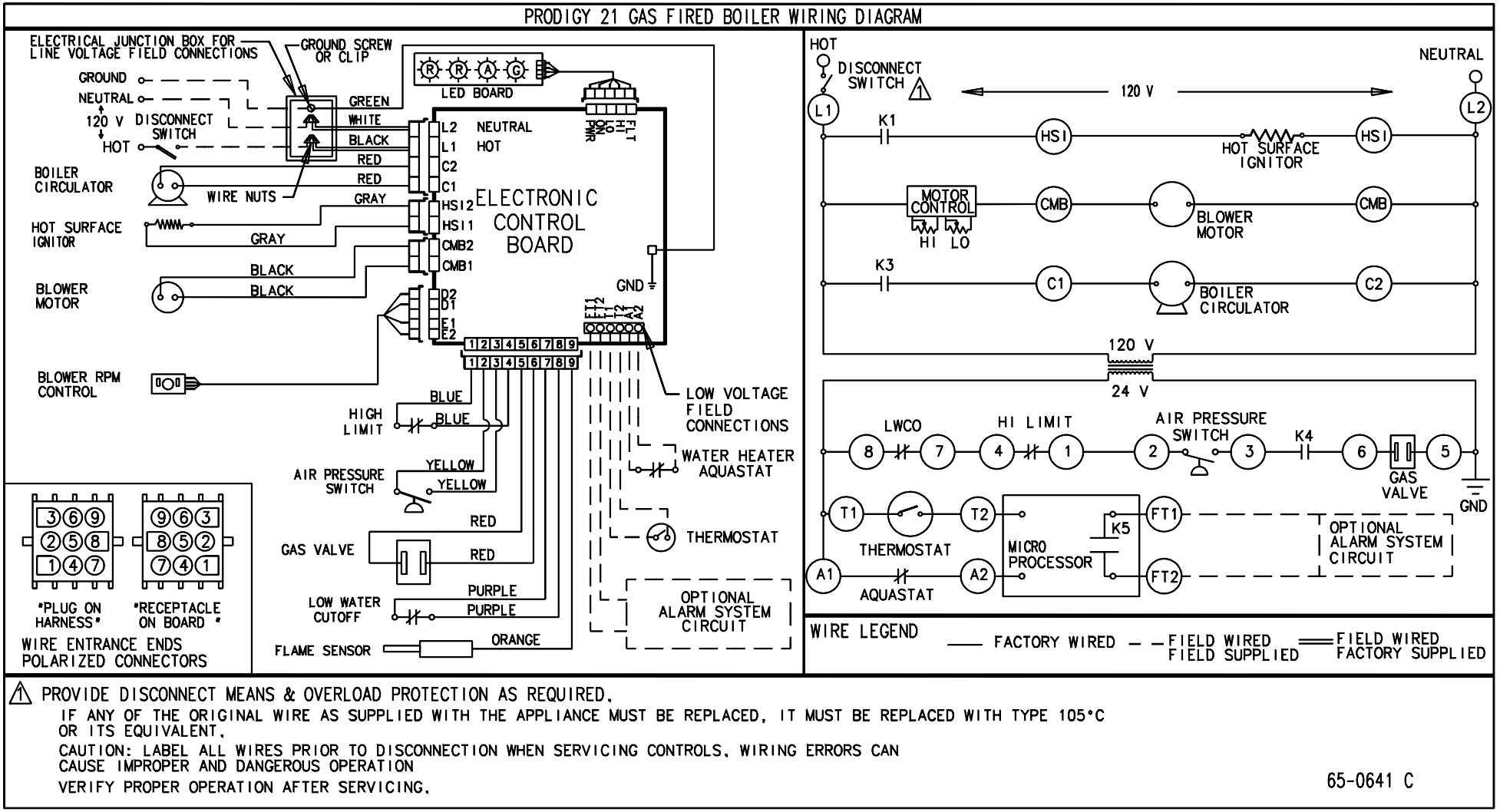
TEST COMMON VENTING SYSTEM (IF REQUIRED)

If existing boiler was removed from a common venting system, common venting system may be too large for proper venting of appliances remaining connected to it.

At the time of removal of existing boiler, the following steps shall be followed with each appliance remaining connected to common venting system placed in operation, while the other appliances remaining connected to the common venting system are not in operation.

1. Seal any unused openings in common venting system.
2. Visually inspect venting system for proper size and horizontal pitch and determine there is no blockage or restriction, leakage, corrosion and other deficiencies which could cause an unsafe condition.
3. Insofar as is practical, close all building doors and windows and all doors between the space in which the appliances remaining connected to the common venting system are located and other spaces of building. Turn on clothes dryer and any appliance not connected to common venting system. Turn on any exhaust fans, such as range hoods and bathroom exhausts, so they will operate at maximum speed. DO NOT operate a summer exhaust fan. Close fireplace dampers.
4. Place in operation the appliance being inspected. Follow the lighting instructions. Adjust thermostat so appliance will operate continuously.
5. Test for spillage at the draft hood relief opening after 5 minutes of main burner operation. Use the flame of a match or candle, or smoke from cigarette, cigar or pipe.
6. After it has been determined that each appliance remaining connected to common venting system properly vents when tested as outlined above, return doors, windows, exhaust fans, fireplace dampers and any other gas-burning appliances to their previous condition of use.
7. Any improper operation of common venting system should be corrected so installation conforms with National Fuel Gas Code ANSI Z223.1 or CAN/CGA B149.1 - M95 or latest edition for natural gas, and CAN/CGA B149.2 - M95 or latest edition for propane. When resizing any portion of the common venting system, common venting system should be resized to approach minimum size as determined using appropriate tables in Part II in National Fuel Gas Code ANSI Z223.1, or CAN/CGA B149.1 - M95 or latest edition for natural gas, and CAN/CGA B149.2 - M95 or latest edition for propane.

WIRING DIAGRAM



1 PROVIDE DISCONNECT MEANS & OVERLOAD PROTECTION AS REQUIRED.

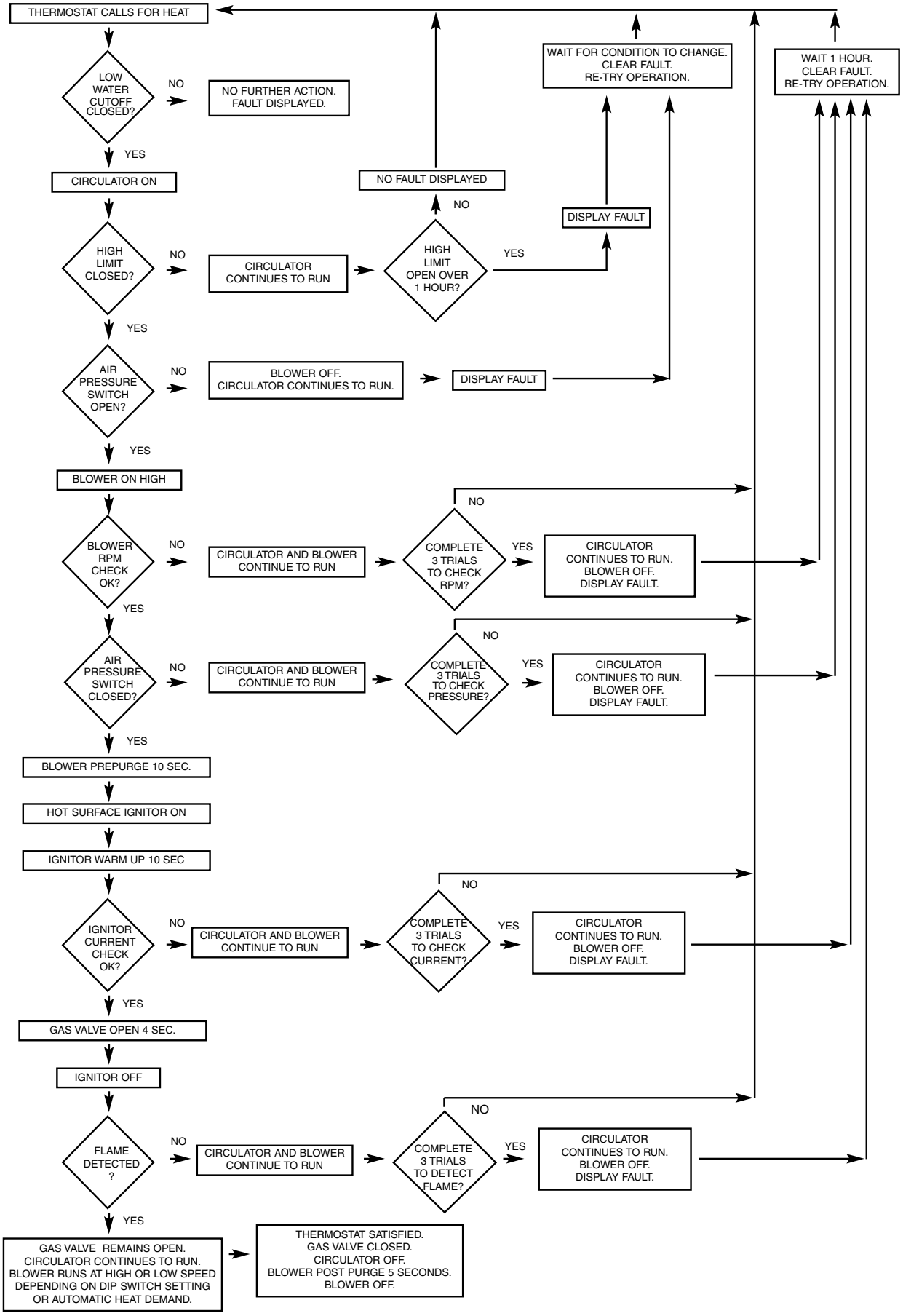
IF ANY OF THE ORIGINAL WIRE AS SUPPLIED WITH THE APPLIANCE MUST BE REPLACED, IT MUST BE REPLACED WITH TYPE 105°C OR ITS EQUIVALENT.

CAUTION: LABEL ALL WIRES PRIOR TO DISCONNECTION WHEN SERVICING CONTROLS. WIRING ERRORS CAN CAUSE IMPROPER AND DANGEROUS OPERATION

VERIFY PROPER OPERATION AFTER SERVICING.

65-0641 C

SEQUENCE OF OPERATION



TROUBLESHOOTING

DIAGNOSTIC INDICATOR LIGHT (RED)

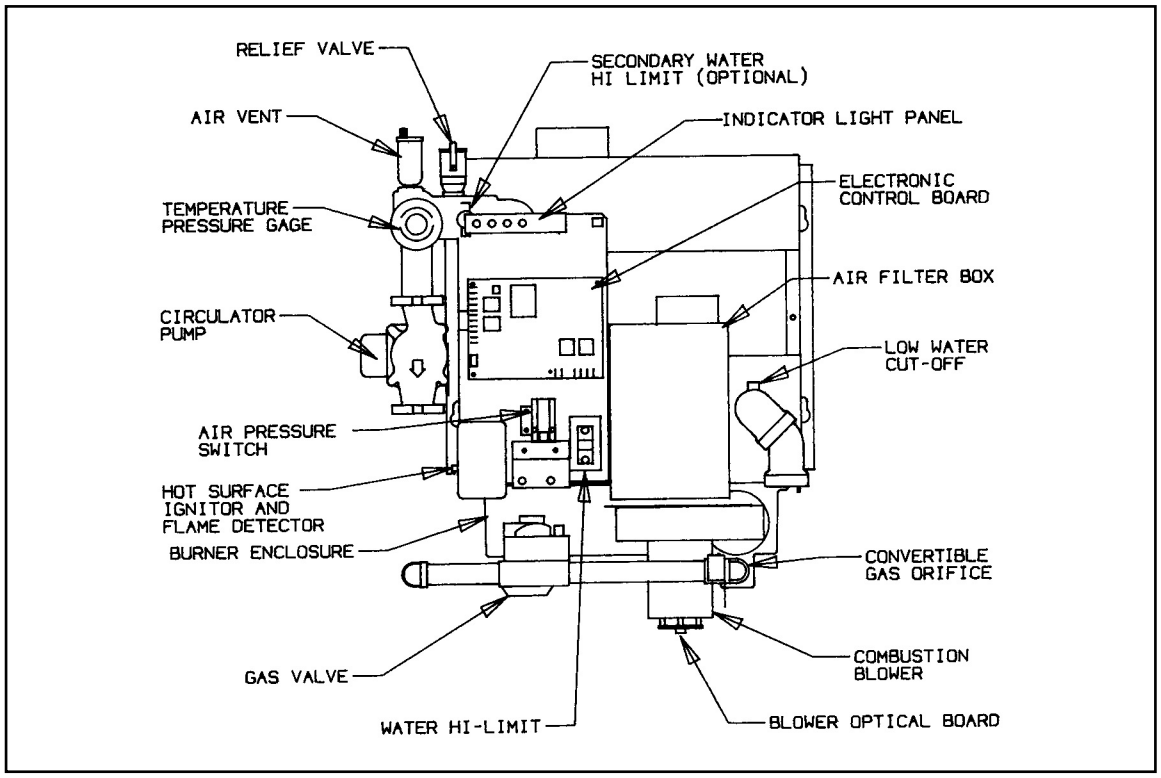
Carefully note red diagnostic indicator light. When a system failure occurs, indicator light will show a series of quick flashes with a short interval between the series when indicator stops flashing. Count the number of flashes that occur after the short no-flashing interval. Correct failure code for each number of flashes is shown in box.

If the diagnostic light is off when service technician arrives, set thermostat to call for heat. Boiler will attempt restart. (Boiler also attempts restart each hour during failure mode and after a power interruption.) If the boiler restarts, the diagnostic light will stay off. If the boiler does not restart, the diagnostic light will return to either Steady On or the series of flashes.

Boiler Failure Codes . . . . . Page

Continuous Flashing
---------Electronic control failure 17
1 Flash----------High limit open 1 hour 17
2 Flashes ------No ignition 17
3 Flashes ------Pressure switch problem 17
4 Flashes ------Hot surface ignitor failure. 18
5 Flashes ------Blower RPM too low 18
6 Flashes ------Low water cutoff open 18
7 Flashes ------Improper flame signal 18
Steady ON-----Loss of flame signal. 18

Figure 25: Boiler components for troubleshooting



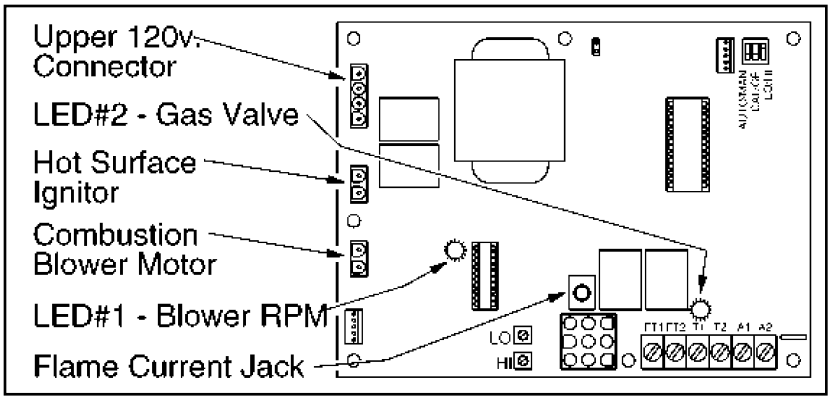


Figure 26: Electronic control board components for troubleshooting

NOTICE: ANY WIRES CUT WHILE SERVICING MUST BE ROUTED TO AND SPLICED INSIDE THE BOILER JUNCTION BOX OR SEPARATE JUNCTION BOX.

Refer to Replacement Parts information on page 27 when parts need to be replaced.

DIAGNOSTIC "Continuous Flashing" - ELECTRONIC CONTROL FAILURE

Electronic Control Is Defective.	Control board cannot be serviced. Replacement must be same manufacturer and model. After replacement, calibrate blower speed as shown in Part 3 in manual.

DIAGNOSTIC "1 FLASH" - HIGH LIMIT OPEN 1 HOUR

CAUSE	TEST	SOLUTION
High Limit Is Defective?	Set high limit above boiler water temperature (raise limit setting substantially as water temperature may be higher than gage reading when there is no water flow through boiler). Check for continuity across high limit contacts.	If contacts remain open, replace high limit. *Replacement must be same manufacturer and model.* DO NOT set above 104°C (220°F).
Circulator Not Running?	With thermostat calling for heat, check for power to circulator. If no power, check wiring connections to circulator.	If power OK, but circulator not running, replace circulator.
Zone Valves Not Opening?	With thermostat calling for heat, check for power to each valve. If no power, check wiring connections to valve.	If power OK, but valve not opening, replace valve.

DIAGNOSTIC "2 FLASHES" - NO IGNITION (No Flame Signal After Trial For Ignition)

No Gas Supply To Gas Valve?	Check that manual gas shutoff is open. Check for gas supply pressure to valve.	If no pressure, check for gas shutoff by utility.
No Gas Supply To Burner?	Check gas valve knob in ON position. Check wiring and tubing connections to valve. Check for power to gas valve. Note gas valve LED on control board (see page 21). Check valve outlet pressure to determine if valve is opening (see "How To Do It" on page 24).	If valve not opening, replace valve. *Replacement must be same manufacturer and model.* Calibrate new valve as shown in Operation Procedures on page 16.
Air-Gas Ratio Is Not Proper?	Check gas valve calibration as shown in Operation Procedures on page 16.	If pressure reading is incorrect, adjust gas valve as shown in Operation Procedures on page 16.
Orifice Sizing Is Not Correct?	Check gas and air orifice size (see Orificing Identification on page 25).	If size not correct, contact Slant/Fin Technical Services Department.
Electrical Connections Are Loose or Reversed?	Check power wiring to electronic board, (hot wire to L1; neutral to L2) ground wire in junction box and to electronic board.	Correct all wiring connections.
Flame Sensor Current Is Weak?	Check flame sensor current with microampmeter (see "How To Do It" on page 24).	If reading is below 1 microamp, continue with "No Ignition" troubleshooting.
Flame Sensor Is Defective?	Remove flame sensor from boiler (see "How To Do It" on Page 24). Check for cracked, wet ceramic insulator or bent, burned, coated kanthal rod.	If defective, replace flame sensor. *Replacement must be same manufacturer, model and length.*

DIAGNOSTIC "3 FLASHES" - PRESSURE SWITCH PROBLEM

Electrical Wiring?	Check wiring connections to pressure switch. Wires go to Normally Open (N.O.) and Common (C) connections on switch.	Correct all wiring connections.
No Pressure Signal To Pressure Switch?	Check for loose, blocked tubing connections to pressure switch; loose blower hose connection; loose blower wheel. Check for blocked air filter, vent terminal or vent tubing.	Secure all loose connections. Tighten blower wheel set screw. Remove obstructions. Replace or clean filter.
Blower Speed Not Correct?	Check blower calibration as shown in Operation Procedures on page 16.	If pressure readings are incorrect, adjust blower speed as shown in Operation Procedures on page 16.
Pressure Switch Is Defective?	Check pressure switch calibration (see "How To Do It" on page 24). Check that pressure switch contacts are open (between N.O. and C) when blower is OFF.	If switch is defective, replace switch with same manufacturer, model and calibration. Observe orientation of clear tubing connections when replacing.

TROUBLESHOOTING: POSSIBLE CAUSES AND SOLUTIONS

Refer to Replacement Parts information on page 27 when parts need to be replaced.

DIAGNOSTIC "4 FLASHES" - HOT SURFACE IGNITOR FAILURE

CAUSE	TEST	SOLUTION
Electrical Wiring?	Check wire connections from ignitor.	Tighten all wiring connections.
Hot Surface Ignitor Tip or Ceramic Insulator Is Broken?	Turn power OFF. Carefully remove ignitor from boiler (see "How To Do It" on page 24). Check for cracks, breakage.	If defective, replace ignitor. *Replacement must be same manufacturer, model and length.*
Hot Surface Ignitor Is Defective?	Energize ignitor while outside of boiler. BE CAREFUL OF HOT TIP. DO NOT allow hot tip to come in contact with your hand or any other objects. Turn off gas valve to prevent gas from exiting ignitor opening and igniting outside of boiler. Observe glow on ignitor tip.	If tip does not glow quickly and strongly, replace ignitor. *Replacement must be same manufacturer, model and length.*

DIAGNOSTIC "5 FLASHES" - BLOWER RPM TOO LOW

Electrical Wiring?	Check wiring connections to motor, particularly cable to RPM control on motor shaft.	Tighten all wiring connections.
Blower Wheel Restricted?	Check that wheel turns freely in housing (Remove filter from filter box; reach down through box to blower wheel). Check for foreign material or misalignment.	If wheel not free or misaligned, replace blower/motor assembly. *Replacement must be same manufacturer and model.*
Blower Motor Not Running?	Set boiler operation selector switch to CAL. Motor should run.	If motor does not run, replace blower/motor assembly. *Replacement must be same manufacturer and model.*
Blower Optical Board Is Defective?	Disconnect Blower Motor connector from control board. Spin the blower wheel by hand while observing Blower RPM Indicator LED on electronic board (see page 21). Indicator should blink on and off with each wheel revolution.	If indicator does not blink, replace board. *Replacement must be same manufacturer and model.*

DIAGNOSTIC "6 FLASHES" - LOW WATER CUTOFF OPEN

High Limit Is Defective?	Set high limit to lowest setting (82°C or 180°F); run boiler to get water temperature above 82°C (180°F). Check for continuity across high limit contacts.	If contacts remain closed when temperature exceeds 82°C (180°F), replace high limit. *Replacement must be same manufacturer and model.* DO NOT set above 104°C (220°F).
Boiler Water Level Too Low?	Check temperature/pressure gage pressure reading. Carefully snap open relief valve handle to determine if boiler is full of water. If not full of water, check for system leaks and check water pressure regulator operation.	Repair any system leaks. Adjust or replace water pressure regulator.
Circulator Not Running?	With thermostat calling for heat, check for power to circulator. If no power, check wiring connections to circulator.	If power OK, but circulator not running, replace circulator.
Zone Valves Not Opening?	With thermostat calling for heat, check for power to each valve. If no power, check wiring connections to valve.	If power OK, but valve not opening, replace valve.

DIAGNOSTIC "7 FLASHES" - IMPROPER FLAME SIGNAL (Flame Signal Detected When Gas Valve Should Be Closed)

Gas Valve Is Defective?	Turn gas valve knob to OFF and check that valve shuts off gas flow.	If gas flow continues, replace valve. *Replacement must be same manufacturer and model.* Calibrate new valve as shown in Operation Procedures on page 16.
Flame Detector Shorted?	Remove flame detector from boiler. Check for coating on rod or material contacting rod inside ceramic or combustion area.	Clean or clear any foreign matter. Replace flame detector, if necessary, with same manufacturer, model and length.

DIAGNOSTIC "Steady ON" - LOSS OF FLAME SIGNAL (Flame Signal Lost After Proper Flame Signal Has Been Established) Boiler continues to run normally but ONLY at high-fire.

Improper Air-Gas Ratio?	Check gas valve calibration at low-fire.	Adjust gas valve at low-fire. Calibrate as shown in Operation Procedures on page 16.
Low Blower Speed?	Check blower calibration at low-fire as shown in Operation Procedures on page 16.	Adjust blower speed as shown in Operation Procedures on page 16.
Bad Flame Sensor?	Check flame current at low-fire.	See "No Ignition" procedure regarding possible flame sensing problems.

Flame Sensor Current

For microampmeter with cable connector, insert cable connector into flame current jack on electronic board (see page 21). Turn power ON. Once the gas valve opens, and ignition occurs at the burner, the microampmeter must read at least 1 microamp to keep the gas valve open. Typically, the reading is between 5 and 10 microamps. (If no reading, polarity may be wrong; reverse leads.)

For microampmeter without cable connector:

- Turn power OFF and remove lead from flame sensor.
- Connect one microampmeter lead to the flame sensor wire lead; connect other microampmeter lead to the flame sensor.
- Turn power ON. Once the gas valve opens, and ignition occurs at the burner, the microampmeter must read at least 1 microamp to keep the gas valve open. Typically, the reading is between 5 and 10 microamps. (If no reading, polarity may be wrong; reverse leads.)

Flame sensor removal

- Turn power OFF and remove lead from flame sensor.
- Remove flame sensor hold-down bracket.
- Carefully pull out flame sensor.

Hot surface ignitor removal

- Turn power OFF and remove ignitor hold-down bracket.
- Carefully pull out ignitor **(handle with care, fragile)**. DO NOT CUT WIRES TO REMOVE IGNITOR.

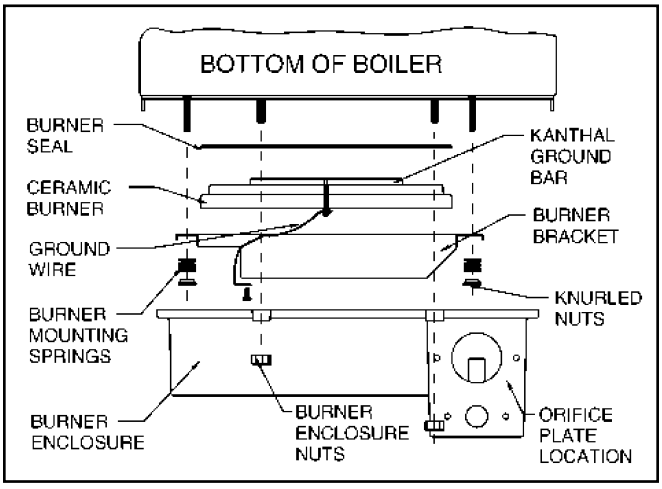
Pressure switch calibration check

- Turn power OFF.
- Remove wire leads from pressure switch terminals.
- Hookup resistance meter between Normally Open (N.O.) and Common (C) terminals.
- With blower off, the switch should be open, meter reading is infinity. If not, switch is defective.
- If switch is open, check cutout pressure with blower running, as described in following steps.
- Hookup differential pressure gage in same manner as to set blower air flow - high side to blower outlet, low side to burner enclosure. The switch and gage both read the same air flow differential pressure.
- Turn on power and raise thermostat.
- Note pressure reading on gage when blower is running. Reading should be higher than the pressure switch cutout pressure, which is marked on the pressure switch label.
- If the pressure switch terminals are still open with the blower running and the gage reading is at least 2.5 mm (.10”) higher than the pressure switch setting, the switch is defective.

Ceramic burner/Kanthal ground bar removal

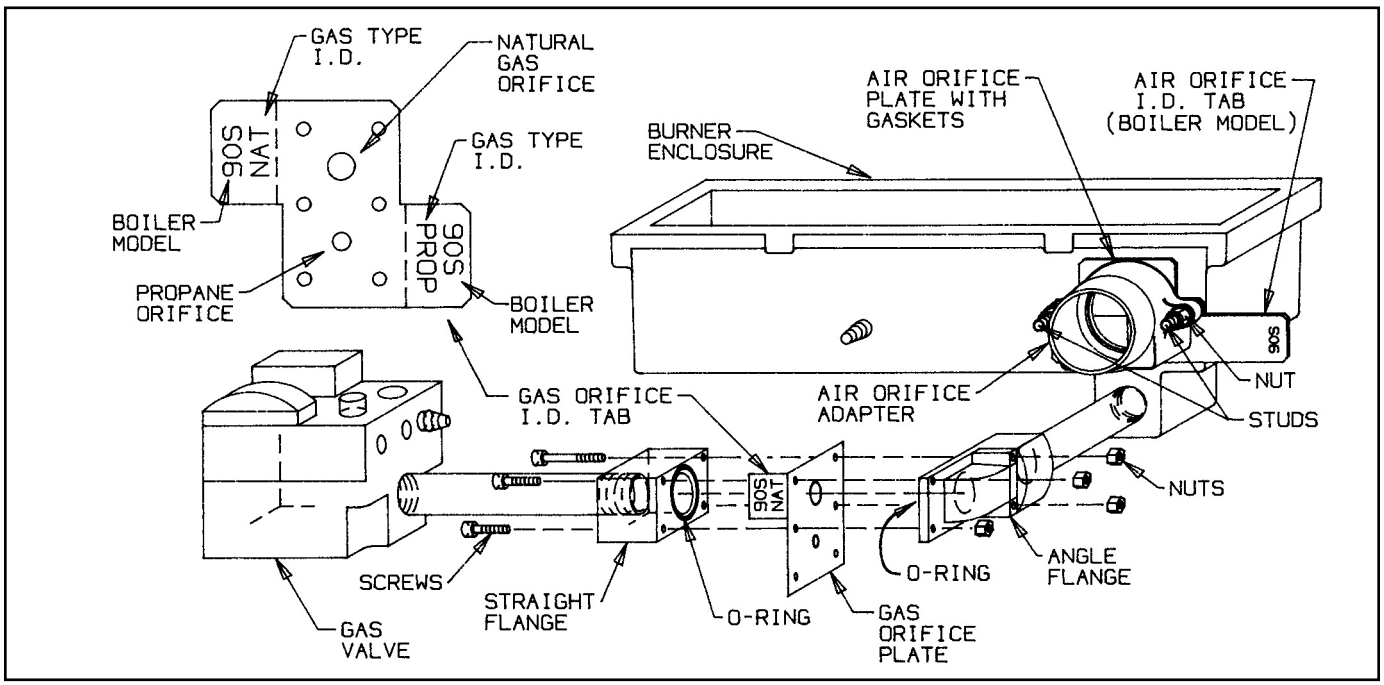
- Remove jacket enclosure around boiler and expansion tank, if necessary, to access burner enclosure.
- Disconnect wires to gas valve. May be necessary to disconnect gas supply line to gas valve to move assembly slightly.
- Disconnect air adapter from burner enclosure.
- Remove air filter box cover to access blower mounting studs and nuts. Remove the four nuts and drop blower down to move out of way.
- Remove nuts around perimeter of burner enclosure, drop down off of studs and remove enclosure.
- Allow burner enclosure to drop down low enough to access burner bracket. Remove and clear tubing, if necessary, but mark location of each tube for reassembly.
- While supporting underside of burner bracket to keep from falling, undo knurled nuts at either end of burner.
- Drop burner down off studs gently. Pull down burner gasket with burner without ripping it.
- Ceramic burner is only attached to the burner bracket by the ground wire, unscrew the wire tab to remove.
- Ground bar is held to burner with a weld stud through the burner, remove the nuts and washers from the underside of the burner to disassemble.
- To reassemble, follow this procedure in reverse, carefully relocating all items removed in their proper location at tightness noted in removal.

Figure 27. Ceramic burner/Kanthal ground bar removal



AIR AND GAS ORIFICES

Figure 28. Convertible gas orifice installation



Note: These Prodigy boilers utilize the same air and gas orifices as the Slant/Fin Concept 21 series boilers. Therefore, the model number shown on the orifice plates reflect the Concept boiler model numbers and correlate to the Prodigy boiler models as follows:

Prodigy 21 Model	Use orifice plates with I.D. tab:
KC-50	marked “45 S”
KC-100	marked “90 S”

GAS ORIFICE PLATE ORIENTATION

1. The gas orifice plate contains both the natural gas orifice hole and the propane gas orifice hole, to provide for a fast and simple conversion to either gas use.
2. Each gas orifice hole on the plate has an I.D. tab located adjacent to it. The I.D. tab specifies the boiler model and type of gas for each orifice. The larger hole in the plate is always the natural gas orifice hole, and is adjacent to the I.D. tab that is stamped “NAT”. The smaller hole in the plate is always the propane gas orifice hole, and is adjacent to the I.D. tab that is stamped “PROP”.
3. When installed properly, the I.D. tab that is stamped for the type of gas being utilized must face outward over the straight flange in the gas manifold, so that it is clearly in view.

GAS ORIFICE PLATE CONVERSION

1. Turn off power and gas supply to boiler.
2. Remove boiler jacket front cover and enclosure (see page 26).
3. Remove the four nuts on the gas manifold angle flange.
4. Pull out the four screws on the gas manifold straight flange far enough to remove the gas orifice plate.
5. Place the gas orifice plate in the position specified in the orientation instructions for the type of gas being utilized. To convert from one type of gas to the other the plate should be rotated 180°. The I.D. tab for the gas being utilized must face outward over the straight flange in the gas manifold so that it is clearly in view.
6. Reposition the four screws through the flanges and orifice plate and tighten the four nuts onto the screws. Make sure the nuts are tightened evenly and with sufficient force to prevent loosening or leakage.
7. Replace boiler jacket enclosure and cover removed for this procedure.
8. The appropriate self-adhesive gas conversion label supplied with these instructions must be positioned adjacent to the boiler rating plate, if the gas being utilized differs from the gas specified on the rating plate.
9. Power and gas supply can be turned back on to operate boiler.

AIR ORIFICE PLATE

1. The air orifice plate for each boiler model is the same for both natural and propane gas — no conversion is necessary.
2. Each model’s air orifice plate has an I.D. tab which protrudes from the side of the boiler, behind the boiler jacket right side cover. The I.D. tab is stamped for the model of each boiler it is to be installed on.

IMPORTANT: Reorificing for altitude change is NOT necessary on this Prodigy boiler.

LIGHTING INSTRUCTIONS

(Reference For Labels 65-0645)

Safe lighting and other performance criteria were met with the gas manifold and control assembly provided on the boiler when the boiler underwent tests specified in ANSI Z21.13.

FOR YOUR SAFETY READ BEFORE OPERATING

WARNING: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

A. This appliance does not have a pilot. It is equipped with an ignition device that automatically lights the burner. DO NOT try to light the burner by hand.

B. BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

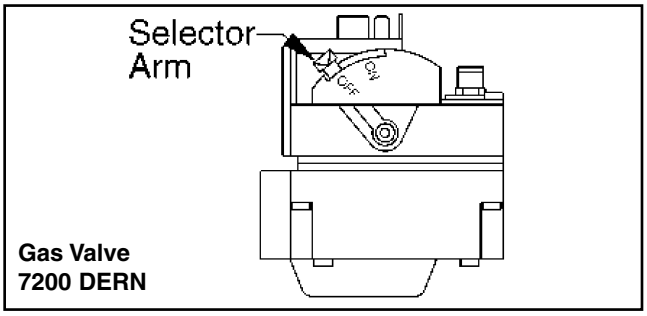
WHAT TO DO IF YOU SMELL GAS
- DO NOT try to light any appliance.
- DO NOT touch any electric switch; DO NOT use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

C. Use only your hand to depress and move the gas control selector arm. NEVER use tools. If the selector arm will not depress or move by hand, DON'T try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

D. DO NOT use this appliance if any part has been underwater. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been underwater.

OPERATING INSTRUCTIONS
- **STOP!** Read the safety information above on this label.
- Set the thermostat to lowest setting.
- Turn off all electric power to the appliance.
- This appliance is equipped with an ignition device which automatically lights the burner. DO NOT try to light the burner by hand.
- Remove boiler front cover.
- Depress and move gas control selector arm left to "OFF" position. Note: Arm cannot be turned to "OFF" unless arm is pushed in slightly. DO NOT force.
- Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, **STOP!** Follow "B" in the safety information above on this label. If you don't smell gas, go to next step.
- Depress and move gas control selector arm right to "ON" position.
- Replace boiler front cover.
- Turn on all electric power to the appliance.
- Set thermostat to desired setting.
- If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier.

TO TURN OFF GAS TO APPLIANCE
- Set thermostat to lowest setting.
- Turn off all electric power to the appliance if service is to be performed.
- Remove boiler front cover.
- Depress and move gas control selector arm left to "OFF" position.
- Replace boiler front cover.



Gas Valve
7200 DERN

BOILER JACKET INSTALLATION / REMOVAL

Note: Follow these procedures in reverse to remove parts.

TO INSTALL BOILER ENCLOSURE
- On installations where venting extends out the side of the enclosure, the appropriate panel (located at top of jacket sides) should be removed entirely to allow venting to pass out of enclosure.
- Place enclosure top over top flange of wall panel.
- Slide down until slots (on the insides of enclosure) are seated in support brackets on mounting panel.
- Attach sheet metal enclosure to wall panel on both sides with screws.

TO INSTALL FRONT COVER
- Insert the slots in cover bottom over support clips on sheet metal enclosure bottom.
- Line up temperature/pressure indicator through hole in front cover and push cover in until support clip (at enclosure top) snaps into slot on cover top.
- Locate 1/4 turn fastener (next to indicator lights) into receptacle behind front cover and turn in by rotating 1/4 turn only.

MAINTENANCE PROCEDURES

This section must be brought to the owner's attention, so the owner can make necessary arrangements with a trained and qualified service technician for periodic maintenance of this boiler. Installer must also inform owner that the lack of proper care and maintenance of this boiler may result in a hazardous condition. Installer should discuss contents of the User's Information Manual with the owner.

KEEP THE BOILER AREA CLEAR AND FREE FROM COMBUSTIBLE MATERIALS, GASOLINE AND OTHER FLAMMABLE VAPORS AND LIQUIDS.

BEFORE EACH HEATING SEASON

A trained and qualified service technician should perform the inspections listed in these instructions at least once a year.

Air filter: Located in sheet metal box in front area of boiler. One quarter turn fasteners hold air filter box cover on. Replace (recommended) or clean filter annually (more often if conditions dictate). Slant/Fin replacement air filter, part number 65-1306 must be used. Can be cleaned with soap and water; after drying, spray with an adhesive-type air filter spray which will attract/hold airborne dust particles.

Vent termination: Check for and remove obstructions.

Closet installations: Check for and remove ventilation and/or combustion air opening obstructions.

Vent tubing: Check for and repair tubing separation, leaks or sagging.

Vent tubing (externally): Check for corrosion of vent material. If corrosion is present, replace and reseal tubing assembly.

Vent and air intake tubing (internally): Check for and remove obstructions. To inspect, remove tubing from boiler. When finished, reseal all removed tubing parts with manufacturer's specified sealant.

Heat exchanger: In the unlikely event of boiler flue passage blockage, service to remedy situation must be performed only by an authorized Slant/Fin representative.

Burner: Annual service of the burner is not necessary. Follow the burner removal procedure on page 24 when improper operation of the boiler necessitates inspection of this part.

System water: Check if full of water and properly pressurized. Check for and correct radiation system air "noise".

Water piping: Check for and repair any leaks.

Gas piping: Check for and repair any leaks.

Clear plastic tubing: Located around burner enclosure area. Check for cracked, loose or blocked conditions. Replace if necessary.

Safety shutdown controls: Check operation as detailed on page 18 in this manual.

Blower: This is a sealed component which does not require lubrication. Check hose assembly on blower outlet for air leakage. Replace if necessary.

Circulator: Some models require lubrication. S.A.E. #20 oil recommended.

WATER TREATMENT

A good water treatment program will extend the useful life of the boiler and is especially recommended in areas where water quality is a problem. A reputable water treatment company should be consulted for determining the best overall treatment program for this equipment.

Providing protection from freezing

Anti-freeze is sometimes used in hydronic heating systems to protect against freeze-up in the event of power failure or control shutdown when the building is unoccupied. It should be recognized that unless the building is kept above freezing temperature by some means, the plumbing system is not protected.
Two types of anti-freeze may be used: ETHYLENE GLYCOL, used in automobiles, has desirable properties, but is toxic. Its use may be prohibited when system water/glycol solution is in contact with a potable water vessel (as with a tankless heater). PROPYLENE GLYCOL is used in the quick-freeze food industry; it is practically non-toxic. Its use may be permitted when tankless heaters are used. When anti-freeze must be used, inhibited propylene glycol is recommended. Useful information on the characteristics, mixing proportions, etc. of glycol in heating systems is given in Technical Topics No. 2A, available from the Hydronics Institute, 34 Russo Place, Berkeley Heights, NJ 07922. Consult glycol manufacturers for sources of propylene glycol.

IF REPLACEMENT PARTS ARE NEEDED

When parts are needed, refer to boiler model and serial number shown on the boiler name/rating plate. Refer to Parts List for Replacement Part Numbers. Whenever possible refer to the original order by number and date.

Control identification and replacement should not be attempted by unskilled personnel. Relief/Safety valves must be ASME rated for the pressure and gross output of the boiler.

This boiler is equipped with an unconventional gas control. If this control is replaced, it must be replaced with an identical gas control and calibrated as specified in the Operation Procedures.

For replacement parts, heating contractors should contact their Slant/Fin boiler distributor.

BOILER PACKAGE/OPTIONS

Boiler package includes, mounted on boiler:
- Full jacket enclosure
- Water manifold/air scoop
- Relief valve
- Automatic air vent
- Circulator pump
- Low water cutoff

Unmounted parts:
- Expansion tank
- Secondary water high limit (optional)
- Service fitting adapters (2)
- Wall mounting lug screws (4)

Literature included:
- Boiler Instruction Manual
- User's Information Manual
- Replacement Parts List

Standard vent kit for horizontal direct venting included with boiler:
- Vent terminal
- Indoor wall plate
- Wall passage thimble
- 305 mm (12") vent adapter tube
- Tight radius 90° vent elbow
- 610 mm (24") PVC Schedule 40 pipe
- PVC Schedule 40 90° elbow
- PVC couplings for air in connection
- Tube of high-temp. RTV sealant

Venting kit options available:
- Vertical venting with roof termination
- Horizontal venting with separate vent and air intake

Refer to Prodigy 21 Replacement Parts List for details on components and part numbers.

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